BC PROGRESS BOARD

STRATEGIC IMPERATIVES FOR BRITISH COLUMBIA'S ENERGY FUTURE

A discussion paper prepared by Sage Group Management Consultants, for the

BC Progress Board

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STRATEGIC IMPERATIVES FOR BRITISH COLUMBIA'S ENERGY FUTURE

Executive Summary

The BC Progress Board, established by Premier Gordon Campbell in July 2001, is an independent panel of 18 senior business and academic leaders. The Board is tasked with benchmarking BC's economic and social performance over time and relative to other jurisdictions. The Board also provides strategic advice to the Premier and the government on ways to improve the economy and provincial social policy supports.

This BC Progress Board report outlines energy opportunities for British Columbia along with specific actions that should now be taken in the energy sector[1]. It does so with the benefit of the provincial energy plan released in 2002. The Report has been informed by a number of participants involved in various aspects of the energy business. These participants are listed in Appendix 1.[2]

Energy is central to our way of life in Canada. It heats our homes, powers our appliances and automobiles, and plays a direct role in the business success of our economy, whether in energy-intensive industries such as forestry or in supporting the information technology world we now work and live in.

The surprising thing about energy is that we generally take it for granted. This is because our part of the world has historically had a good supply of reliable and relatively inexpensive energy. This is not true in some other parts of the globe. Even in North America, as witnessed in California and Ontario, energy can be both unreliable and expensive if energy policy is inadequate and/or not implemented well.

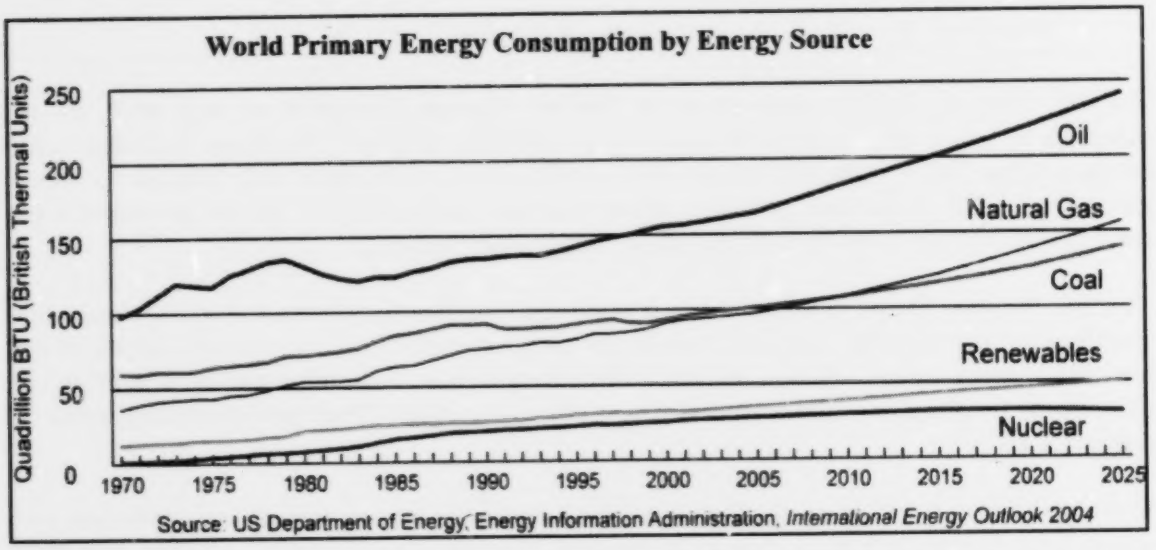
This Report provides a number of forward-looking recommendations on how British Columbia's energy sector can be enhanced. These recommendations take global as well as North American energy developments into account. The recommendations follow from six emerging strategic imperatives. Taken together, the recommendations are designed to improve the British Columbia economy and our way of life.

The demand for energy remains strong. From 2001 to 2025 world energy consumption is expected to increase by 59 percent. Energy consumption in the developing world, which includes China and India, is projected to grow by 2.8 percent per year, well above the 1.3 percent per year projected for the industrialized world. Oil will remain the dominant fuel, continuing to represent 39 percent of energy sources by 2025. Natural gas will be the next largest energy source growing at the highest rate of all energy sources. Natural gas is also used for electricity generation, as it is efficient and burns more cleanly than either coal or oil. Coal will remain an important energy

[1] The energy sector is defined for this paper as including all sources of energy for household and industrial use, with the exception of refined petroleum products for vehicular use.

[2] Appendix 1 reflects discussions to-date.

source. Renewable energy, which includes hydropower, though still modest in size, will grow while nuclear energy will remain a small portion of total energy sources. See Chart 1 below.



Although still very small in global terms, British Columbia has become an important source of energy for Western Canada. It is also a major exporter of natural gas to the US Pacific Northwest and coal to Asia, Europe and the United States. British Columbia's energy success is the result of the following:

- A diversified supply of energy in the province that includes abundant natural gas and coal resources, significant hydroelectric resources developed on both the Peace and Columbia Rivers, good conditions for the development of renewable energy sources, and the development of technology to support innovation in energy;

- The foresight of government and the private sector to develop transportation systems to get energy to market. Approximately 50 percent of British Columbia's natural gas serves the needs of the United States (mainly in the US Pacific Northwest) and this has been the case for more than 50 years. There is also an extensive electricity transmission system in the province given the distance between generation on the Peace and Columbia rivers and the bulk of demand which is in the Lower Mainland;

- Ongoing efforts by government and industry to develop an efficient regulatory regime for natural gas and specific measures by government to improve the environmental assessment process for major projects; and,

- A provincial energy policy that is balanced and forward-looking and recognizes the interrelationship between economic and environmental issues, the importance of reliable and appropriately-priced energy to domestic industry and households, and the need to grow the energy sector to support economic growth at home and to take advantage of trading opportunities with other jurisdictions.

As with most public policies, energy policy needs ongoing review and British Columbia's energy situation is no exception. The compelling need to grow the BC energy sector is as follows:

> **British Columbia has natural advantages in energy resources and an energy sector that is rapidly matching forestry as the primary economic engine of the province. Growing the energy sector will underpin economic growth in the province over the long term. Growth requires a balanced approach that includes conventional, new, and alternative sources of supply, has a particular focus on efficiency and conservation using new technology, and ensures self-sufficiency and also economic gain through export opportunities. Energy resources are owned by the province and therefore balanced growth will improve the government's finances and its ability to fund public services such as health care and education. The likely result will be a high standard of living in the province in both economic and social terms.**

This Report describes several important Strategic Imperatives that emerged from the analysis and consultations. Some of the main issues related to these Strategic Imperatives are noted below and the primary recommendations are summarized in the next section of the report. To understand the Strategic Imperative it is necessary to read the Description and Analysis of each, which is found in the main body of the report.

- To protect and promote the public interest and our market advantages in the energy sector, the provincial government must have a comprehensive and current energy plan at all times and ensure it is followed by the public agencies responsible, particularly BC Hydro. Public agencies must have the resources and expertise to manage a complex and continuously changing sector. BC needs to be a competitive jurisdiction with regard to royalties and regulation while meeting social and environmental imperatives. Industry, government and First Nations must develop productive working relationships that are beneficial to all parties involved. The government should plan for the best long-term use of oil and gas revenues.

- One of BC's advantages is our natural gas resource. There are many undeveloped or underdeveloped natural gas sources. The northeast of the province is the focus of industry production at present and should remain so as it still has considerable potential as well as infrastructure, services, an experienced labour force and communities who understand the industry.

- BC's other major advantage in energy is our current and potential electricity supply. However we are no longer self-sufficient in electricity. We need to ensure we have an adequate and reliable supply of electricity at a predicable cost over the long term, particularly as the global energy supply becomes more uncertain. Consequently, we need to make some hard choices now about the best new sources of electricity to build in the province.

- Alberta and BC are energy interdependent. Alberta exports its oil and gas though BC. We trade in electricity and we rely on refined petroleum products from Alberta. The Alberta oil sands development is an energy project of global proportions and will fundamentally change the energy sector in Canada and North America. BC must identify and promote its interests in this regard, including ensuring its own natural gas production does not falter due to lack of labour and equipment. We need to negotiate a mutually beneficial strategy with Alberta.

- Conservation and energy efficiency and alternative energy supplies are ways we can reduce greenhouse gas emissions. If electricity rates are set too low, it does not send the right signals to consumers. They over consume electricity, or replace other energy sources such as natural gas with electricity, and drive up demand. There are a vast array of conservation and efficiency technologies and programs available. The public does not have the information or price incentive to make the most of them.

- BC has had the luxury of a secure supply of energy, which has resulted in complacency about where it will come from in the future and at what cost. BC Hydro is an authoritative voice in the province on energy issues. It needs to communicate our current situation clearly and allow the public to understand the required trade-offs, based on awareness and information, so that we can ensure we have a reliable and affordable supply of energy over the long term.

In conclusion, British Columbia's economy, as with every developed economy, relies on access to energy.

British Columbia is vulnerable with regard to its use of refined oil products, primarily for transportation. We import most of what we use and, as we can see every time we go to the gas pumps, we are price takers in a world of volatile and unpredictable oil prices and supply. Our advantage lies with electricity and natural gas.

With regard to electricity, British Columbia has had a few strong decades of being able to supply its population and others with low-cost, reliable electricity from a renewable source, hydroelectric dams. That's as good as it gets. That advantage has diminished as few new sources of electricity have been developed. We are now net importers of electricity and we import more each year. BC should again be self-sufficient in electricity and, in fact, we should be in a net export position. Being a net importer – as at present – puts us in an increasingly weak position with regard to protecting our economy.

We don't need to be electricity importers. There are options open to us. We could build or expand hydroelectric dams. Depending on the price, we could use our own natural gas to generate electricity. We could build small run-of-river hydro projects. We could put a sincere effort into developing real alternatives such as geo-thermal, wind, tidal and solar generation. And of course we could get serious on a collective and personal level about conservation and efficient use of what we have. A reasonable approach would be to pursue all of these options, subject to price considerations, concurrently and in moderation. Then we will have a diversity of sources of energy while having a reasonable impact on the environment.

With regard to natural gas, we are unique in North America in that our discovered natural gas reserves which are primarily in the Northeast and our production levels are still growing at a time when the demand for natural gas is increasing and reserves elsewhere are declining. We also have significant potential to develop natural gas in the Bowser and Nechako basins and off-shore. However, British Columbians need to use natural gas more effectively. If it is used to replace coal or oil, it produces lower greenhouse gas emissions. In some instances, it can be used very efficiently, depending on the price, for electricity generation and for transportation, in some instances.

We do need to do something, though. We haven't done anything significant to increase our electricity supply for twenty years. We will never be significant players in a global energy market driven by demand in the US, China and India, but we may soon find ourselves in a world taking drastic measures to feed its unsustainable dependency on oil.

The least we can do is to take the opportunity to responsibly meet our own energy requirements where we are best able to do so.

"The Breaking Point"

"In the past several years, the gap between demand and supply [of oil], once considerable, has steadily narrowed, and today is almost negligible. The consequences of an actual shortfall of supply would be immense. If consumption begins to exceed production by even a small amount, the price of a barrel of oil could soar to triple-digit levels [It is about $60 a barrel now]. This, in turn, could bring on a global recession, a result of exorbitant prices for transport, fuels and for products that rely on petrochemicals – which is to say, almost every product on the market. The impact on the American way of life would be profound: cars cannot be propelled by roof-borne windmills. The suburban and exurban lifestyles, hinged to two-car families and constant trips to work, school and Wal-Mart, might become unaffordable or, if gas rationing is imposed, impossible. Carpools would be the least imposing of many inconveniences; the cost of home heating would soar – assuming, of course, that climate-controlled habitats do not become just a fond memory."

Source: "The Breaking Point", by Peter Maass, The New York Times Magazine, August 21, 2005

Strategic Imperative 1 – British Columbia Should Protect and Promote its Real Advantages in the Energy Sector

British Columbia has a diversified supply of energy and great potential to develop new supply for domestic consumption and export. This is at a time when energy demand in North America is expected to remain strong while many conventional sources of supply outside British Columbia are depleting. In addition, China and India have become economic forces with large energy requirements. BC must plan for and regulate energy in a manner that preserves its real advantages.

Recommendations

To protect and promote British Columbia's energy sector potential:

- The provincial government must ensure it has a long-term energy plan that is kept current and it must closely monitor implementation of the plan by all involved parties, such as various government ministries and agencies, including BC Hydro, the BC Transmission Corporation, the Columbia Power Corporation, the BC Utilities Commission and the BC Oil and Gas Commission. Annual progress reports on energy plan implementation are needed;

- All orders of government (provincial, federal and local) must keep the energy sector competitive. This will require constant government attention to industry demands regarding their tax burdens of all types, royalty regimes, regulatory efficiencies and the availability of skilled labour. It will also require ongoing balancing of economic, environmental and social objectives if the public is to continue to support development of the industry;

- Government, communities and industry must forge working relationships with First Nations. The energy sector requires access to land, water and resources. Without a mutually beneficial working relationship with First Nations, access is complicated and slow, and full potential for all parties involved in the energy sector simply cannot be realized;

- The public sector needs to develop a creative and sophisticated human resources plan to attract and retain highly qualified individuals to formulate public policy in energy, regulate the energy sector including environmental assessment, and provide the commercial acumen needed by BC Hydro, the BC Transmission Corporation and the Columbia Power Corporation. This will be a significant challenge given the demand for energy sector expertise for energy developments world wide, and the difficulty the public sector faces in competing financially with the private sector for labour; and,

- The provincial government should establish a small "blue ribbon" panel of experts to advise the government by on how best to use its future natural gas and oil royalties, taking the experiences of Alberta, Alaska and Norway into consideration.

Strategic Imperative 2 – Northeast British Columbia Should Remain the Primary Focus of BC's Natural Gas Industry

The demand for natural gas in Canada and the United States remains strong. British Columbia has numerous undeveloped or underdeveloped sources of natural gas including the BC portion of the Western Canada Sedimentary Basin (northeast British Columbia), the Bowser and Nechako Basins, the BC offshore, and coalbed methane located in many places throughout the province. These sources of supply are significant. Even the northeast is undeveloped relative to Alberta, though it has been producing natural gas for more than 50 years.

Recommendations

To build on our competitive advantage in natural gas:

- The oil and natural gas industry and government should continue to focus on natural gas development in the northeast. The northeast has extensive natural gas reserves and infrastructure, including roads, gathering systems, processing facilities, a growing service sector, good transportation pipelines, and community and First Nations awareness and involvement;

- The federal and provincial government should provide more detailed information to the public on the potential for BC's offshore oil and gas industry and make the analysis of this potential a priority with clear direction on the environmental safeguards, actions and time frames required to move forward;

- Government should allow one or two pilot projects with regard to the extraction of coalbed methane in British Columbia. Coalbed methane extraction is a new industry to British Columbia and is not well understood. Furthermore, it requires extensive environmental safeguards and land management, and modern technology. Therefore, developing the resource incrementally once community concerns about issues such as noise, water pollution and extensive land use have been successfully addressed, is the prudent course of action; and,

- Public agencies should adopt the use of natural gas in public transit.

Strategic Imperative 3 – British Columbia Should Become Self-Sufficient in Electricity

British Columbia is now a net importer of electricity and this dependency runs counter to ensuring provincial energy security and benefiting from export opportunities. British Columbia needs to increase its electricity supply and can do so from a range of sources including alternative energy.

Recommendations

To become self-sufficient in electricity:

- The provincial government must establish a clear provincial policy that BC's goal is to be self-sufficient in electricity. British Columbia should be in a position to meet its own electricity needs. This policy should include provision for the province to be a net exporter of electricity and also promote the trading of electricity where it is cost effective to do so.

- The provincial government and BC Hydro must explain clearly the need for additional supply. This case pertains to the need for greater domestic security to meet expected population and industrial growth in coming years. It also pertains to the benefits of export and the significant risks of being import dependent;

- BC Hydro must call for competitive and comprehensive proposals for electricity supply recognizing the long lead times involved to build facilities and the variety of potential projects that must be considered, from small run-of-river projects to Site C on the Peace River;

- BC Hydro must provide greater certainty and predictability on how new electricity generation projects will be included in BC Hydro's electricity supply, including defining clearly what qualifies as clean energy and the contractual arrangements involved; and,

- The provincial government should foster greater public-private partnerships in energy in order to increase investment in the sector and transfer project risk from the public sector to the private sector.

Strategic Imperative 4 – British Columbia, Alberta and the US Pacific Northwest Can Benefit from Their Joint Energy Interests

British Columbia and Alberta have joint energy interests. These interests include the development and transmission of electricity and the transportation of oil and natural gas for domestic use and export. The development of the Alberta oil sands and the need to get both Alberta oil and electricity to market provide an unparalleled opportunity for cooperation and resulting benefit between the two provinces.

Transportation systems to get energy to markets in the Pacific Northwest are also critical to British Columbia. Approximately 50 percent of BC's natural gas is exported to Washington and Oregon and transportation systems for oil and natural gas are built

incrementally as demand dictates. Transmission systems for electricity were built decades ago and now need upgrading and new investment to meet growing demands in British Columbia. They are also required to take advantage of the trading opportunities between British Columbia and Alberta and Washington State, as the regional electricity supply becomes more integrated through the application of common standards and rules of operation. British Columbia also needs to position itself to benefit from opportunities related to pipeline development in Alaska and the Northwest Territories.

Recommendations

- Establish a British Columbia/Alberta joint strategy, co-sponsored by the two energy ministers, to do the following:
    - Attract and retain skilled labour for the energy sector in both provinces, including for the regulation of the sector;
    - Identify significant energy opportunities of mutual benefit (for example, manage the electricity systems in the two provinces to benefit both jurisdictions);
    - Start planning for utility corridors given the need to move BC and Alberta energy to foreign markets;
    - Begin joint planning with BC Port Authorities on how best to strengthen and expand BC ports to move BC and Alberta energy to external markets;
    - Inform the two provincial Cabinets of action required by government to grow the energy sector (for example, the need for common standards to facilitate the movement of large equipment); and,
    - Engage the private sector in developing regulatory improvements (for example, the design of outcome-based regulation).

- The provincial government, through BC Hydro, the BC Transmission Corporation, and the Centre for Energy should explain to British Columbians the regional interdependence in electricity transmission and in oil and natural gas transportation, and that this regional interdependence requires reliable and efficient transmission and transportation so that the public will be more supportive of new transmission and transportation projects;

- The provincial government needs to ensure that the BC Transmission Corporation has the plan and the resources to upgrade and expand the BC transmission system. This is important within British Columbia because more energy transmission is required especially near and in the Lower Mainland as its population grows; and,

- With regard to opportunities in Alaska and the NWT, the BC government needs to maximize benefits to British Columbia:
    - British Columbia, Yukon and Alaskan governments must strike a trilateral economic arrangement focusing on the potential transportation of Alaskan natural gas through the Yukon and British Columbia;

- British Columbia and the Northwest Territories must reach a bilateral agreement that focuses on the gathering, processing and transportation of natural gas from the NWT; and,
- British Columbia should market Northern BC as the best choice for the terminus of the anticipated Alaska and Mackenzie Valley pipelines. This will position Northern BC to become the location of a major trading hub for natural gas.

Strategic Imperative 5 – Conservation and Energy Efficiency are Essential

Climate change is the most prominent environmental and economic global issue of our time. Air quality is a growing health concern for British Columbians, especially in the Fraser Valley. BC energy demand exceeds supply, but it is increasingly difficult for new large electricity generation, transmission or natural gas pipeline projects to get public approval in BC due to the required trade-offs in lower air quality due to higher emissions, environmental impact, and costs. We must reduce energy consumption and emissions. Energy conservation, energy efficiency, and alternative energy sources are the only way to achieve this imperative.

Recommendations

- The provincial government should implement its Energy Efficiency for BC Buildings strategy with a strong emphasis on, and funding for, public education, awareness and incentives to change behaviour;

- The provincial government, through the BC Utilities Commission should direct BC Hydro to introduce pricing of electricity that sends the correct signals to all consumers for their energy decisions, mindful of the government's pricing policy with respect to heritage assets;

- BC Hydro and FortisBC should increase public awareness and greater accessibility to the energy conservation and energy efficiency options they offer and establish ambitious targets for public participation in these options and the resulting energy savings; and,

- BC businesses and utilities must take advantage of the funding offered by the federal government as part of its Kyoto Protocol greenhouse gas reduction obligations to develop new business opportunities in conservation, energy efficiency, and alternative energy sources for domestic use and for foreign markets.

Strategic Imperative 6 – The Public Requires Information About the Reality of BC's Energy Supply and Demand So We Can Make Informed Choices

The BC public is not well informed on energy issues. Orderly development of an energy sector requires public knowledge and participation.

Recommendations

- BC Hydro should partner with an organization that specializes in public communication and education with regard to the energy sector, such as the Centre for Energy,[3] to develop and implement a comprehensive public information and education strategy with the goal of increasing public understanding of BC's electricity supply shortage and the choices we face in increasing supply;

- The provincial government, with BC Hydro, the BC Transmission Corporation, and the Centre for Energy should explain to the public our interdependence with Alberta and the U.S. in electricity transmission and natural gas and oil transportation. The public will only support new pipeline and transmission line projects if it understands their purpose and benefit to British Columbians;

- Natural gas companies and the provincial government should communicate the advantages of natural gas in displacing other fossil fuels and in being more energy efficient than electricity for many uses; and,

- BC Hydro and FortisBC should increase public communication about the energy efficiency and energy conservation options that they currently have available for consumers with the goal of increasing their use.

[3] See www.centreforenergy.com. The Centre for Energy was established in 2002 with funding from the Canadian Association of Petroleum Producers, the Small Explorers and Producers Association of Canada and EnCana Corporation with the mission "to be the primary source of information, data and educational materials pertaining to Canada's energy sector and energy-related issues."

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TABLE OF CONTENTS

Executive Summary i

Summary of Recommendations vi

I. INTRODUCTION 1

II. GENERAL CONTEXT 2

III. STRATEGIC IMPERATIVES 4

Strategic Imperative 1 – British Columbia Needs to Protect and Promote its Real Advantages in the Energy Sector 4
Description and Analysis 4
Recommendations 10

Strategic Imperative 2 – Northeast British Columbia Should Remain the Primary Focus of BC's Natural Gas Industry 12
Description and Analysis 12
Recommendations 14

Strategic Imperative 3 – British Columbia Should Become Self-Sufficient in Electricity 15
Description and Analysis 15
Recommendations 22

Strategic Imperative 4 - British Columbia, Alberta and the US Pacific Northwest can Benefit from their Joint Energy Interests 22
Description and Analysis 23
Recommendations 26

Strategic Imperative 5 - Conservation and Energy Efficiency are Essential 27
Description and Analysis 28

Strategic Imperative 6 – The Public Requires Information About the Reality of BC's Energy Supply and Demand So We Can Make Informed Choices 32
Description and Analysis 32
Recommendations 34

IV. CONCLUSION 36

Appendix A: Interviews and Teleconferences 38

Appendix B: Interview and Teleconference Questions 40

Appendix C: Board Members, Staff and Advisory Group Members 41

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I. INTRODUCTION

This Report is prepared by Sage Group Management Consultants for the BC Progress Board. It is the result of the BC Progress Board's desire to provide forward-looking guidance on major public issues in British Columbia. Energy and the opportunities for growing the energy sector in British Columbia constitute a major public policy issue facing the province. As a result, the BC Progress Board asked Sage Group Management Consultants to outline the opportunities for growing the energy sector in British Columbia and to recommend how they might be realized.

The Report has the benefit of a major task force report on energy policy, *"Strategic Considerations for a New British Columbia Energy Policy,"* released in 2002. It also has the benefit of the provincial energy policy, *"Energy for our Future: A Plan for BC,"* released in the same year. In addition, Sage Group Management Consultants took advantage of a vast array of information on energy provided by many sources. Those sources, where directly relevant, are cited in footnotes. It also took advantage of discussing energy and energy-related matters with a host of participants in the energy sector. These participants and the organizations they represent are listed in Appendix 1. The general questions used to facilitate the dialogue are contained in Appendix 2.

The Report specifically addresses electricity, natural gas, oil, alternative energy sources and conservation and efficiency measures for household and industrial use. It only makes passing reference to the vehicular use of energy. That is an important matter for separate consideration, and was discussed in the BC Progress Board's December 2004 report *"Transportation as an Economic Growth Engine."*

The Report provides a general context in which to think about opportunities in the energy sector in British Columbia. It then outlines six Strategic Imperatives that emerged from the analysis and the dialogue with energy sector participants. These Strategic Imperatives each constitute a separate section of the Report. The Strategic Imperative is first stated followed by an analysis of why the Strategic Imperative is relevant to growing the energy sector in the province. Once the analysis is complete, a series of specific recommendations follow.

II. GENERAL CONTEXT

The demand for energy remains strong. From 2001 to 2025 world energy consumption is expected to increase by 59 percent. Energy consumption in the developing world, which includes China and India, is projected to grow by 2.8 percent per year, well above the 1.3 percent per year projected for the industrialized world. See Table 1 below.

Table 1: World Energy Demand Growth - 2001 to 2025, 10^6 Terajoules

Region/Country	2001	2005	2010	2015	2020	2025	Average Annual Percent Change, 2001-2025
North America*	121.7	131.2	144.5	156.6	167.8	180.5	1.7
United States	102.1	108.7	119.3	128.4	137.0	146.5	1.5
Canada	13.2	15.0	16.1	16.8	17.4	18.0	1.3
British Columbia	**1.1**	**1.2**	**1.4**	**1.5**	**1.6**	**1.6**	**1.6**
Total industrialized	222.7	234.3	252.8	269.8	285.5	303.6	1.3
Total Eastern Europe/ Former Soviet Union	56.1	64.3	69.4	75.4	80.8	86.7	1.8
Total Developing	146.6	157.7	184.0	214.6	247.8	283.9	2.8
Total World	425.3	456.3	506.1	559.9	613.9	674.0	1.9

Note: *Includes Mexico

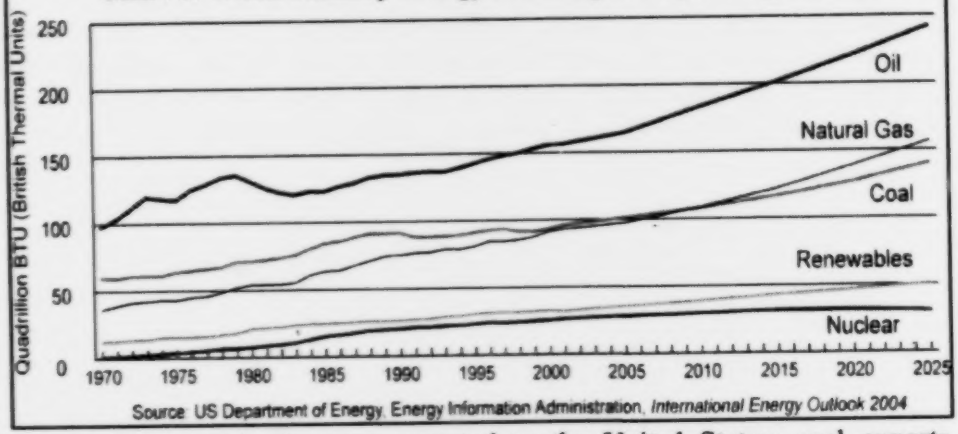
Sources: *International Energy Outlook 2003*, Energy Information Administration, US Department of Energy; National Energy Board

Oil will remain the dominant fuel, continuing to represent 39 percent of energy sources by 2025. Natural gas will be the next largest energy source growing at the highest rate of all energy sources. Natural gas is also used for electricity generation as it is efficient and burns more cleanly than either coal or oil. Coal will remain an important energy source. Renewable energy, which includes hydropower, though still modest in size, will grow. Nuclear energy will remain a small portion of total energy sources. See Chart 1 below.

North America is increasingly interconnected when it comes to energy.

British Columbia produced $11.2 billion of energy in 2004. See Chart 2.

Chart 1: World Primary Energy Consumption by Energy Source

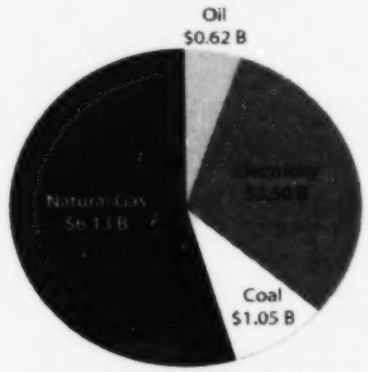


Source: US Department of Energy, Energy Information Administration, *International Energy Outlook 2004*

Over half of BC natural gas production was exported to the United States; coal exports worldwide are strong. British Columbia produced $3.5 billion in electricity (although it is no longer self-sufficient in electricity). In addition, British Columbia is the base for: hydrogen fuel cell development; a unique experiment to harness tidal energy; successful implementation of geo-thermal energy solutions at the local level; and a series of other measures to harness energy that are both cost effective and clean. At the same time, British Columbia is seeing the

emergence of energy efficient technologies that have both domestic and foreign application. Put simply, British Columbia is now the second most important energy province in Canada with a diversity of energy supply and a potential for increases in energy exports that will position the province to be an energy leader in North America. See Chart 3.

Chart 2: Value of BC Energy Production 2004
$11.2 Billion



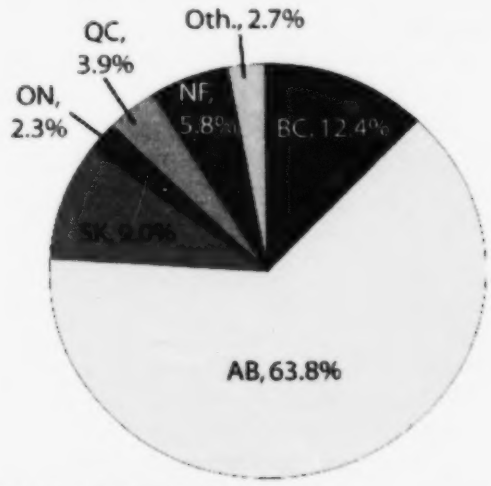
Sources: BC Ministry of Energy and Mines (Oil & Gas); Statistics Canada (Electricity*); BC Mining Plan (Coal)
Note: *2003 data

The value of British Columbia energy production was estimated to be $11.2 billion in 2004. More than half of this (54.7%) is from Natural Gas and its by-products.
The value of energy production in British Columbia has increased by 24% since 2001.

The compelling need to grow the energy sector can be summarized as follows:

British Columbia has natural advantages in energy resources and an energy sector that is rapidly matching forestry as the primary economic engine of the province. Growing the energy sector will underpin economic growth in the province over the long term. Growth requires a balanced approach that includes conventional, new, and alternative sources of supply, has a particular focus on efficiency and conservation using new technology, and ensures self-sufficiency and also economic gain through export opportunities. Energy resources are owned by the province and therefore balanced growth will improve the government's finances and its ability to fund public services such as health care and education. The likely result will be a high standard of living in the province in both economic and social terms.

Chart 3: Energy Production by Province, 2003



Source: BC Ministry of Energy and Mines
Note: Oth. includes Nova Scotia, New Brunswick, Manitoba, the Territories and Nunavut

Approximately 12.4% of total Canadian energy production originated in British Columbia in 2003. BC is second only to Alberta.

BC accounted for the following shares of total Canadian production: coal, 45.2%; natural gas, 12.4%; primary electricity (hydro), 12.4%; gas plant natural gas liquid, 5.8%; secondary electricity (thermal), 4.0%; crude oil, 2.0%.

The Strategic Imperatives that follow provide further detail on the compelling need for growth and the actions required to realize it.

emergence of energy efficient technologies that have both domestic and foreign application. Put simply, British Columbia is now the second most important energy province in Canada with a diversity of energy supply and a potential for increases in energy exports that will position the province to be an energy leader in North America. See Chart 3.

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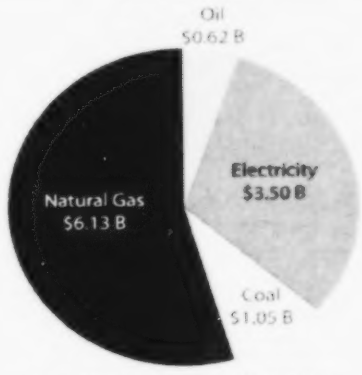
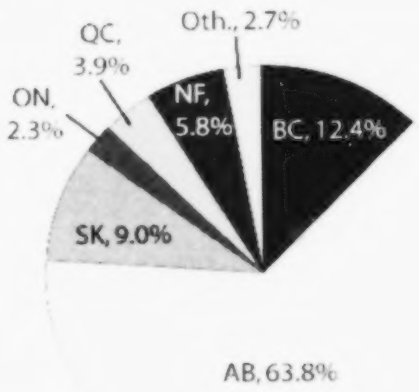


The compelling need to grow the energy sector can be summarized as follows:

British Columbia has natural advantages in energy resources and an energy sector that is rapidly matching forestry as the primary economic engine of the province. Growing the energy sector will underpin economic growth in the province over the long term. Growth requires a balanced approach that includes conventional, new, and alternative sources of supply, has a particular focus on efficiency and conservation using new technology, and ensures self-sufficiency and also economic gain through export opportunities. Energy resources are owned by the province and therefore balanced growth will improve the government's finances and its ability to fund public services such as health care and education. The likely result will be a high standard of living in the province in both economic and social terms.

Chart 3: Energy Production by Province, 2003



The Strategic Imperatives that follow provide further detail on the compelling need for growth and the actions required to realize it.

III. STRATEGIC IMPERATIVES

Strategic Imperative 1 – British Columbia Needs to Protect and Promote its Real Advantages in the Energy Sector

British Columbia has a diversified supply of energy and great potential to develop new supply for domestic consumption and export. This is at a time when energy demand in North America is expected to remain strong while many conventional sources of supply outside British Columbia are depleting. In addition, China and India have become economic forces with large energy requirements. BC must plan for and regulate energy in a manner that preserves its real advantages.

Description and Analysis

Energy Plan

In 2002 the provincial government issued an energy plan for the province that was informed by the report of a Provincial Task Force on Energy Policy.[4] This energy plan has guided many public policy changes over the last three years. For example: BC Hydro has remained a publicly owned corporation and it has maintained a low "heritage" rate for electricity for all customers to reflect the low cost of generation from the Peace and Columbia River hydroelectric dams; BC Hydro has recently established a new higher rate for incremental electricity use for industrial users to reflect the higher cost of new sources of electricity supply; at government's direction BC Hydro split off its transmission facilities and has them managed in a separate Crown corporation called the BC Transmission Corporation; BC Hydro has set a standard to get 50 percent of new electricity supply from BC clean energy within 10 years although it has not yet achieved this objective; the BC Utilities Commission has been reinstated as the regulator for BC Hydro; and the BC government has a new Energy Efficiency for BC Buildings Strategy to reduce energy use in homes and other buildings, although it has not yet updated the *Energy Efficiency Act* in this regard.

Other major directions have not yet been implemented. For example: the government does not yet have a greenhouse gas emissions and air quality strategy; and independent power producers (IPPs) are in continuing discussion with the BC Transmission Corporation and BC Hydro with regard to how IPPs can best contribute to electricity supply.

Given the complex and fast changing circumstances with regard to energy supply facing the province and the government's responsibility as the steward of energy resources on behalf of the public, the province must ensure it has an up-to-date energy plan at all times and that the plan is acted on. In particular this plan needs to address emerging issues of: how to define and act on energy self-sufficiency; how to get a significant amount of new electricity supply from alternative sources; how to promote and protect its interests with regard to competition from

[4] See "Energy for our Future: a Plan for BC" on the Ministry of Energy, Mines and Petroleum Resources website at www.gov.bc.ca and "Strategic Considerations for a new British Columbia Energy Policy: Final Report of the Task Force on Energy Policy," March 15, 2002.

Alberta for labour and energy markets; how to respond to opportunities related to oil and gas pipeline construction in NWT and Alaska; how best to participate in and respond to the federal government's climate change initiatives; and how to involve the private sector in addressing BC's electricity needs.

It is time to update the 2002 plan.

Competitiveness and Balance

As part of its energy plan the province stated that it would provide support to encourage more private sector investment in natural gas production. Consequently, it has improved roads required to access the resource, provided royalty incentives for companies to develop sources of natural gas that are more difficult to access, and made it possible to extend production for a longer period of time each year. As well, there has been continuous improvement in the Oil and Gas Commission application process.

Given growing market demand for natural gas and increasing production in response, the government must work continuously to ensure it is providing a competitive environment for the industry while protecting the public's environmental and social interests. For example, the government is proposing to move to results-based regulation of the industry. In a results-based system, government's role is defining regulatory objectives and verifying that the objectives are achieved. Companies are responsible for determining how they will achieve those objectives. Assessing whether or not an objective has been achieved requires that a comparison of post-activity conditions be made against either pre-activity conditions or a set of pre-established standards. The regulator must impose consequences for non-compliance and provide incentives for compliance. Results-based regulation is intended to provide greater assurance that the desired outcome (i.e. protection of water ways or worker safety) will be achieved, as the company is expected to do what it takes to ensure the outcome. Low risk activities are best suited to a results based approach.[5]

As pressure to develop oil and gas resources in BC intensify, it is increasingly important to balance development with the protection of social and environmental objectives. The Progress Board heard from a wide range of parties in industry, government, and non-government organizations with similar concerns about how to ensure a balanced approach in order to preserve the support of the BC public for oil and gas development. Many of those common concerns have been articulated in the document "Oil and Gas in British Columbia: 10 Steps to Responsible Development" by West Coast Environmental Law and endorsed by 12 organizations. This document forms the basis for a reasonable dialogue about how best to address these real and pressing issues. This is not to suggest that the 10 steps have unanimous support. They do not. Moreover, some of the recommendations are not realistic in their current form. For example, with regard to Step 3, the use of a good incentive system is essential to the development of oil and natural gas. Differences in royalty rates are designed to acknowledge that access to the resource, and therefore the costs involved, vary. Nonetheless, there are several

[5] Refer to "Economic Growth Through Regulatory Reform" published by the BC Progress Board, February 23, 2005, for a more complete discussion of approaches to and benefits from regulatory reform.

elements to the 10 steps that provide hope that stakeholders in industry, government, communities, First Nations and environmental organizations have a basis to form common ground and workable solutions.

Box 1:

"Oil and Gas in British Columbia, 10 Steps to Responsible Development"

(Please note: The content of this box is reproduced from a publication by West Coast Environmental Law and does not necessarily reflect the views of the BC Progress Board.)

Summary of Recommendations:

1. Implement an Energy Plan for BC with more measured oil and gas development, increased conservation and efficiency measures, and aggressive promotion of renewable energy and hydrogen-based energy storage and delivery.
2. Create jobs by providing incentives for oil and gas companies to employ BC workers and to direct oil and gas into value-added products made in BC, and by aggressively shifting energy production into more labour-intensive renewable and energy efficiency projects.
3. End subsidies and royalty breaks to the oil and gas industry, and direct 25% of oil and gas revenues into a BC "heritage" fund to support a just transition to sustainable industries.
4. Give landowners and locals the power to say no to oil and gas development that may adversely affect them; at a minimum, provide BC citizens the same rights as Albertans to have their concerns addressed before approvals are granted.
5. Create an independent health and pollution body to research, strengthen and enforce pollution and health rules in BC relating to oil and gas activity.
6. Recognize First Nations Treaty and Aboriginal Rights and Title through meaningful joint management, including First Nations consent over development, revenue sharing, and management of cumulative impacts.
7. Restore monitoring and enforcement staff to pre-2001 levels, and index increases in staff to wells drilled; implement meaningful fines for infractions; maintain oversight roles of agencies other than the Oil and Gas Commission.
8. Suspend coalbed methane development until comprehensive studies into well spacing and water issues are completed to the satisfaction of affected communities, and until appropriate safeguards are put in place.
9. Protect the integrity of BC's parks by reversing legislative changes that undermine our system of protected areas, and disallow industrial roads and development within park boundaries.
10. Establish binding cumulative impact thresholds in BC's oil and gas areas and budget activity between various uses of the landscape to be conducted within those thresholds.

Source: Oil and Gas in British Columbia, 10 Steps to Responsible Development
Karen Campbell, West Coast Environmental Law et. al., April 2004.

First Nations

A fundamental requirement for the oil and gas industry is access to land to be able to explore and develop the resource. At present gas production occurs in the north east of the province, which is part of the land covered by Treaty 8. The ongoing issue in this area is how First Nations can continue to exercise their treaty rights which include the right to live on, feed themselves from, access medicinal plants on and hunt and fish on these lands. These First Nations have been increasingly concerned about the incremental approach to gas well authorizations used by the Oil and Gas Commission which results in cumulative industry impacts on the land (roads, seismic lines, drill sites, flaring) that are not taken into consideration in granting access for each

individual well. They also want their communities to participate in the new wealth being generated by industry activity in the area, which was not taken into consideration when the treaty was negotiated over a hundred years ago. As the oil and gas industry expands to other areas in the province, there are even more complicated issues with respect to unresolved claims between First Nations and government regarding ownership of the land.

Hydroelectricity generation requires access to rivers for dams and to land that may be flooded. When the Peace and Columbia River hydroelectric system was built in the 1960s and 1970s, little consideration was given to the effect on First Nations communities and in some cases communities were flooded without prior notice or compensation. The land that may be affected for the Site C hydroelectric dam, for example, includes a tract of land between the Peace and Moberley Rivers that the Saulteau and West Moberley First Nations have identified as an area of critical community interest based on their use of it for purposes protected under Treaty 8.

The provincial government is advocating a new relationship with First Nations that includes the following statement of guiding principles:

> "We will mutually develop processes and implement new institutions and structures to achieve the following:
>
> - integrated intergovernmental structures and policies to promote co-operation, including practical and workable arrangements for land and resources decision-making and sustainable development;
> - efficiencies in decision-making and institutional change;
> - recognition of the need to preserve each First Nations' decision-making authority;
> - financial capacity for First Nations and resourcing for the Province to develop new frameworks for shared land and resource decision-making and to engage in negotiations;
> - mutually acceptable arrangements for sharing benefits, including resource revenue sharing; and,
> - dispute resolution processes which are mutually determined for resolving conflicts rather than adversarial approaches to resolving conflicts.[6]"

Without a mutually beneficial working relationship with First Nations, access to land is complicated and slow, and full potential for all parties involved in the energy sector simply cannot be realized. Government must define these principles fully and put them into practice in a way that ensures BC's natural advantages in the energy sector are preserved and promoted.

Regardless of government's actions, it is incumbent upon companies and First Nations to understand each other's perspectives and objectives and develop mutually beneficial business arrangements. This is often the only rational approach to managing a project that will otherwise simply never get off the ground. It is also an opportunity for success as demonstrated by the partnership between the Fort Nelson First Nation, Ensign Drilling and Encana Corp (See Box 2).

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[6] See "The New Relationship" on the website for the Ministry of Aboriginal Relations and Reconciliation at www.gov.bc.ca

Box 2:

Innovative Partnership: Fort Nelson First Nation, Ensign Drilling Services and EnCana Corp.

Eht'oni means arrow in Dene and it is the name of a state-of-the-art drilling rig owned 50-50 by the Fort Nelson First Nation and Ensign Drilling Services Group Inc. EnCana Corp. is also a key partner in the success of Eht'oni because it guarantees it will employ the rig "on a first up and last down" priority. This guarantee convinced the First Nation to enter into the high stakes oil and gas game heating up in its own backyard.

"We want to benefit, and we want to participate," says Liz Logan, Chief of the Fort Nelson First Nation. "Our goal is to be financially independent, proud and self-reliant."

Chief Logan faces a constant balancing act between protecting the spiritual and cultural needs of her people and responding to the accelerated pace of industrial development in the traditional lands of the Treaty 8 First Nations.

"We need to pursue sustainable development that's compatible with our culture and the traditional people who live on our lands," she says.

The Greater Sierra region encompasses the Fort Nelson First Nation's traditional lands. Michael Graham, EnCana's President for Canadian Foothills and Frontier Regions, describes the Greater Sierra as "EnCana's largest regional gas play in Western Canada in the past 10 years." The Greater Sierra now produces 350 million cubic feet of gas per day. Graham projects activity levels of 200 wells per year for the next five years at approximately $1.6 million per well.

Ensign operates Eht'oni on behalf of the partnership and Bob Geddes, President of Canadian Operations for Ensign, says that 75 jobs have been created to support the rig's operations. This includes one First Nelson band member. Geddes says he would like to see more Fort Nelson members working on the rig, as it's expensive to fly personnel north.

But band members are in scarce supply, says Logan. "We're proud to say that we've got one of the lowest unemployment rates in BC."

Source: "First Nation's 'arrow' aimed at prosperity", by Susan Eaton, Business Edge, June 10, 2004

Public Sector

The Province owns energy resources and is responsible for managing them in the best interests of the public. There are a number of public sector entities with mandates related to protecting and advancing the public interest. These include: the Minister and Ministry of Energy, Mines and Petroleum Resources, which has policy setting and resource allocation responsibilities for electricity, oil and gas, and energy conservation and efficiency; the British Columbia Utilities Commission, which is responsible for hearing matters of public interest with regard to rate setting and facilities construction by regulated energy utilities; BC Hydro and Power Authority with responsibility for providing electricity supply to the majority of the population; BC Transmission Corporation, which manages BC Hydro's electricity transmission systems; the BC Environmental Assessment Office responsible for reviewing project development proposals for economic, environmental and social impacts and establishing requirements that they must meet to get approval to proceed; the Oil and Gas Commission which reviews applications for natural

gas and oil development; and Columbia Power Corporation, which operates specific hydro facilities on the Columbia River.

In discussion with the Progress Board, many parties stressed the importance of the overarching responsibility of the BC government, and specifically the Ministry of Energy Mines and Petroleum Resources, to determine energy policy and ensure it is implemented. There was particular concern expressed that the government does not have adequate staff and budget dedicated to developing electricity supply policy and ensuring that this policy is adhered to by BC Hydro. It is the role of the BC government to speak for the public in this regard and it is the role of BC Hydro to follow the direction of the government. BC Hydro is seen by many concerned parties to heavily outweigh the ministry in staff and resources, which puts the government in the position of not being able to provide adequate oversight and direction to BC Hydro. As a consequence, BC Hydro is seen as setting its own policies with regard to electricity supply or responding to matters of public interest, such as the government's Energy Plan, in its own time and manner. The BC government needs to boost the resources available to the ministry so that it can manage the public's interest with regard to energy in general and electricity in particular.

All of these public sector organizations have complex issues to manage, as described throughout this report. They all require highly qualified and specialized individuals with a sophisticated understanding of the energy sector and the public interest in the use of BC's energy resources. They are often dealing with matters ranging from business negotiations with very well resourced private sector interests with global operations, to local property owners and communities with very specific concerns about their futures. Consequently, the BC Public Service Agency and the Crown corporations involved must develop a creative and sophisticated human resources strategy to attract and retain the expertise required. This is particularly challenging given intense competition with the private sector for qualified and capable staff and the current constraints in the public sector with regard to salaries, benefits, and terms and conditions of work.

Future Revenues and Investments

A central consideration with regard to stewardship of the resource is the best public use of resource royalties. A number of jurisdictions that have benefited from having extensive oil and gas resources have addressed the issue of what to do with an abundance of public revenue from these sources to ensure that future generations benefit from the current exploitation of the resource. See Box 3 for a summary of the approach taken in Alaska, Norway and Alberta.

The provincial government's goal is to increase capital investment in natural gas production in the province by 20 percent from 2004 to 2008. Anecdotal predictions in the natural gas industry are that BC is 20 years behind Alberta in development, and that BC should plan for growth in the northeast similar in density to that in Alberta at present. World energy prices and demand, the potential use of natural gas as a fuel that has lower emissions than oil and has some value in greenhouse gas reduction, declining supply elsewhere in the world, and the potential for new sources of supply in the Nechako and Bowser Basins and offshore in BC all point to the possibility that BC will see intense development and high royalty revenues on its natural gas

resources over at least the next two decades. Consequently, British Columbia should determine now how best to use these revenues.

The governments of Alberta, Alaska and Norway have used oil and gas royalties to first meet their immediate needs and ensure their annual operating budget is in a surplus before they invest for the future. BC has a significant annual provincial budget requirement to meet, and provincial debt to manage, before it will have the luxury of excess revenue to invest for the future. However, it can learn from the experience in other jurisdictions and have a solid plan in place now.

The government should establish a small "blue ribbon" panel of experts to advise it on the following:

- Projected energy revenues over the next two decades;
- The principles to be followed by the provincial government in spending and investing energy revenues accruing to the government;
- How these proposed principles compare with those adopted in Norway, Alaska and Alberta;
- The required public process that should be followed before principles related to the spending and investing of energy revenues accruing to government are adopted; and,
- The timing for new principles to come into effect.

Recommendations

To protect and promote British Columbia's energy sector potential:

- The provincial government must ensure it has a long-term energy plan that is kept current and it must closely monitor implementation of the plan by all involved parties, such as various government ministries and agencies, including BC Hydro, the BC Transmission Corporation, the Columbia Power Corporation, the BC Utilities Commission and the BC Oil and Gas Commission. Annual progress reports on energy plan implementation are needed;

- All orders of government (provincial, federal and local) must keep the energy sector competitive. This will require constant government attention to industry demands regarding their tax burdens of all types, royalty regimes, regulatory efficiencies and the availability of skilled labour. It will also require ongoing balancing of economic, environmental and social objectives if the public is to continue to support development of the industry;

- Government, communities and industry must forge working relationships with First Nations. The energy sector requires access to land, water and resources. Without a mutually beneficial working relationship with First Nations, access is complicated and slow, and full potential for all parties involved in the energy sector simply cannot be realized;

- The public sector needs to develop a creative and sophisticated human resources plan to attract and retain highly qualified individuals to formulate public policy in energy, regulate

the energy sector including environmental assessment, and provide the commercial acumen needed by BC Hydro, the BC Transmission Corporation and the Columbia Power Corporation. This will be a significant challenge given the demand for energy sector expertise for energy developments worldwide, and the difficulty the public sector faces in competing financially with the private sector for labour; and,

- The provincial government should establish a small "blue ribbon" panel of experts to advise the government on how best to use its future natural gas and oil royalties, taking the experiences of Alberta, Alaska and Norway into consideration.

Box 3:

Funds for the Future

Alberta: Alberta's decisions regarding the investment of its oil and gas revenues have reflected the rise and fall of industry performance. In response to windfall revenues, in 1976 Alberta established the *Heritage Savings Trust Fund*, which received 30% of all resource revenues annually and income earned by the fund was re-invested. After oil prices collapsed in the mid-1980s the annual deposit was reduced to 15% and earnings were transferred to government's general revenue. In 1988, the fund was capped and all resource revenues were diverted to general revenue. By 2005, the fund had **$11.4 billion (CDN)** in assets. In 2003 Alberta established the *Sustainability Fund*, which now receives all resource revenue in excess of $4.75 billion but is used as a contingency reserve for government, which can withdraw funds for emergency expenditures. With the return of hefty oil and gas revenues, Albertans are once again revisiting the issue of what to do with a new round of windfall profits.

Alaska: Alaska voters approved a constitutional amendment in 1974 to create a *Permanent Fund*, which receives 25% of certain oil tax revenues annually. The remainder is used by the state government as general revenue. Income generated by the fund is reinvested and dividends are paid out every year to residents of Alaska. From 1982 to 2004, the dividends have ranged from $331.29 to $1,963.86 with a general upward trend. In 1990 the state added the *Constitutional Budget Reserve Fund* which receives a set portion of certain resource revenues and all income earned by the fund is reinvested. It is used to fund state budget deficits and receives budget surpluses. The *Permanent Fund* has received $10.8 billion, a similar amount to Alberta's *Heritage Fund*. But, unlike Alberta, it has paid out $13.1 billion in dividends and is worth **$27.4 billion (US)** due to regular deposits, the reinvestment of earnings and a policy to inflation-proof the fund. In 1998 the earnings of the *Permanent Fund* exceeded state oil revenues for the first time.

Norway: Norway's *Petroleum Fund* was established by its parliament in 1990 to invest part of the large national trade surplus that accrues from the Norwegian petroleum sector. A driving force behind the creation of the fund was a belief that revenues from Norway's North Sea oil fields have peaked and will decline significantly over coming decades. The purpose of the fund is to mitigate this decline and smooth the effects of volatile oil prices. Deposits to the fund were not made until 1994/5 when the national budget was in a surplus position. Today, all oil and gas resource revenue and the net earnings of state oil and gas interests are deposited annually. Interest earned is reinvested. The government's annual budget deficit is funded at the end of each year by an appropriation from the fund. Since 1994/5 $134.4 billion has been invested in the fund. This has grown to **$196.2 billion (US)** and the government predicts it could reach $331.7 billion by 2010. The windfall is due to a drastic increase in North Sea production to three million barrels a day (about twice Alberta's oil sands production), high world oil prices and public ownership of oil production. How to invest and use the fund is a hot political topic.

Source: "Investing Wisely - An Investment Strategy for Creative Leadership," August 2005, Canada West Foundation.

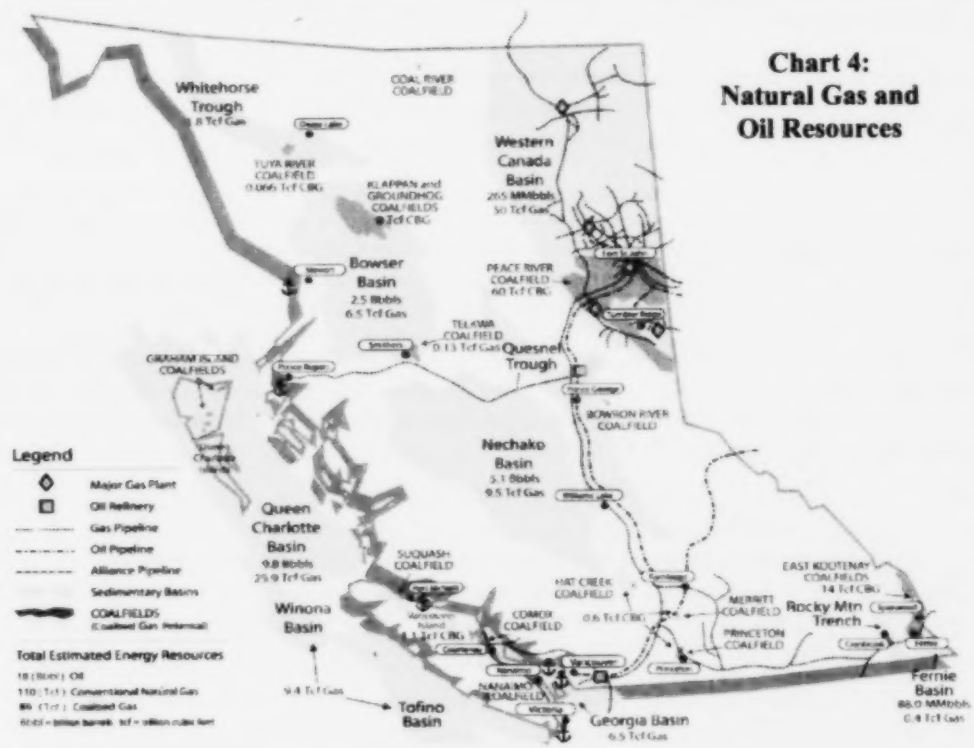
Strategic Imperative 2 – Northeast British Columbia Should Remain the Primary Focus of BC's Natural Gas Industry

The demand for natural gas in Canada and the United States remains strong. British Columbia has numerous undeveloped or underdeveloped sources of natural gas including the BC portion of the Western Canada Sedimentary Basin (northeast British Columbia), the Bowser and Nechako Basins, the BC offshore, and coalbed methane located in many places throughout the province. These sources of supply are significant. Even the northeast is undeveloped relative to Alberta, though it has been producing natural gas for more than 50 years.

Description and Analysis

British Columbia is blessed with significant reserves of natural gas and coalbed methane reserves[7] and more limited reserves of oil. See Chart 4.

Chart 4: Natural Gas and Oil Resources



Source: Ministry of Energy, Mines and Petroleum Resources

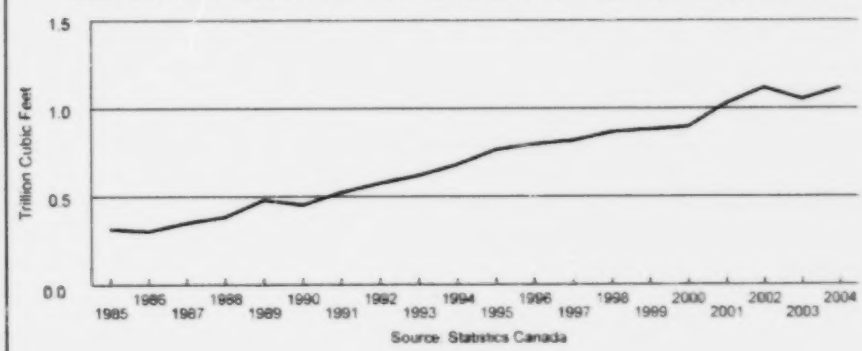
[7] Coalbed methane (CBM) is the natural gas found in most coal deposits. CBM is created through a process by which plant material is converted into coal over millions of years. Under most circumstances, CBM consists of pure methane. Commercially produced coalbed methane can be distributed by the existing natural gas distribution system and used for heating homes and businesses.

The sales value of British Columbia's oil and natural gas production in 2004 exceeded $6 billion. Further, about 15,000 people were directly employed in oil and natural gas production and an additional 25,000 jobs were indirectly linked. Oil and natural gas revenues account for approximately eight percent, or more than $2 billion, of total provincial government revenues and are the largest source of natural resource revenues to government.

Although oil production remains an important part of the industry in British Columbia, natural gas is by far the dominant product, accounting for 90 percent of current drilling activity and revenues. British Columbia produces more than twice the volume of natural gas it consumes.

BC's production of natural gas meets more than three percent of demand in Canada and the US and, as indicated earlier, demand for natural gas is growing. See Chart 5 for growth in BC natural gas production.

Chart 5: British Columbia Total Gross National Gas Production



There are several reasons why British Columbia has the potential to be an even larger producer of natural gas:

- The demand for natural gas in Canada and the United States is expected to remain strong at a time when the proven natural gas reserves in most jurisdictions are depleting. The amount of proven natural gas in BC is still growing;
- BC's northeast is now well developed with improved infrastructure and services. The provincial government, industry and the communities in the northeast have made large investments and worked cooperatively to make this happen;
- Natural gas processing facilities and transmission capability in the northeast are well developed and expanded as demand dictates;
- Treaty rights as outlined in Treaty 8 for First Nations in the northeast provide a degree of certainty for First Nations and investors; and,
- The BC Oil and Gas Commission has been effective in meeting the interests of the public and facilitating development.

For the most part, the northeast of British Columbia holds the most promise for further natural gas development over the medium term for the reasons outlined above. As a result, the northeast of the province should be the primary focus of government and industry alike.

At the same time, government needs to build the foundations for natural gas development and potentially coalbed methane development in the rest of the province. There are significant resources to develop elsewhere in British Columbia as outlined in Chart 4.

The provincial government needs to determine from industry what geological information and infrastructure are required to facilitate investor interest in the Nechako and Bowser Basins. It can then develop a joint strategy with industry and other participants to set the stage for exploration and development.

A similar approach is needed for the BC offshore. We require good information to guide decision-making. BC can learn from experiences around the world, including Canada's east coast, to determine where the resources are, the costs and benefits of extracting them, and how such development fits with a broader marine strategy for British Columbia. As a first step, the usefulness of seismic work in determining the location and potential of reserves, and whether there is a better approach, needs to be evaluated.

In addition, something needs to be said about coalbed methane. It holds great development potential in many locations across British Columbia. Development of coalbed methane has a significant history in the United States and today eight percent of US natural gas comes from coalbed methane. Alberta is also active in coalbed methane development.

But coalbed methane development requires the use of large amounts of water and access to extensive tracts of land. The technology for extraction is developing and depends in part on the geology and topography of the land in each specific location. Development in British Columbia will likely be more complicated than in most other jurisdictions. Therefore, government, industry and communities should be working together to demonstrate where development might best take place, while addressing environmental and community concerns.

Recent events in China warrant particular note. China is now a significant factor in world energy demand. It is relying on oil and coal-fired electricity to support its industrial growth. It recognizes the environmental advantages of replacing oil and coal-fired electricity with a cleaner burning hydro-carbon, namely natural gas and natural gas-fired electricity. It is moving to do so where possible. The interesting element in this aspect of the Chinese energy strategy is the recognition of the current environmental problem and the fact that natural gas provides a partial solution.

Many British Columbians think we are still net exporters of electricity. As discussed in Strategic Imperative 3, we are now net importers. This misunderstanding removes any sense of public urgency to find new sources of electricity and gives us a false sense of security.

Natural gas is a BC advantage. We need to increase its use in the province; for example, as a fuel source for public transit buses. It provides income, employment, substantial revenue to government, and major environmental gains over coal-generated electricity.

Recommendations

To build on our competitive advantage in natural gas:

- The oil and natural gas industry and government should continue to focus on natural gas development in the northeast. The northeast has extensive natural gas reserves and good

infrastructure, including roads, gathering systems, processing facilities, a growing service sector, good transportation pipelines, and community and First Nations awareness and involvement;

- The federal and provincial government should provide more detailed information to the public on the potential for BC's offshore oil and gas industry and make the analysis of this potential a priority with clear direction on the environmental safeguards, actions and time frames required to move forward;

- Government should allow one or two pilot projects to proceed with regard to the extraction of coalbed methane in British Columbia. Coalbed methane extraction is a new industry to British Columbia and is not well understood. Furthermore, it requires extensive environmental safeguards and land management, and modern technology. Therefore, developing the resource incrementally once community concerns about issues such as noise, water pollution and extensive land use have been successfully addressed, is the prudent course of action; and,

- Public agencies should adopt the use of natural gas in public transit.

Strategic Imperative 3 – British Columbia Should Become Self-Sufficient in Electricity

British Columbia is now a net importer of electricity and this dependency runs counter to ensuring provincial energy security and benefiting from export opportunities. British Columbia needs to increase its electricity supply and can do so from a range of sources including alternative energy.

Description and Analysis

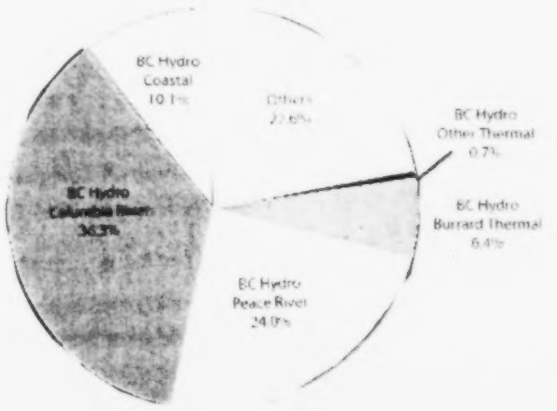
Electricity is a key component of British Columbia's overall energy sector. BC Hydro, a provincially owned Crown Corporation, supplies nearly all of British Columbia's electricity demand. The Crown corporation owns approximately 80 percent of the generation and transmission systems[8] in British Columbia. Its subsidiary, Powerex, does the majority of BC's electricity trading with other jurisdictions. Investor-owned FortisBC serves approximately 125,000 customers in the southeastern area of the province.[9]

[8] Transmission is owned by BC Hydro but managed by the British Columbia Transmission Corporation, a separate Crown corporation.

[9] Other investor-owned utilities serving British Columbians include Hemlock Valley Electrical Services, Princeton Light and Power, Yoho Power and Yukon Electrical Company. Some large industrial companies, such as Alcan and Teck Cominco Limited, generate their own power, and several municipalities (Grand Forks, Kelowna, New Westminster, Penticton and Summerland) operate distribution facilities that purchase their supply and transmission requirements. Nelson Hydro owns and operates substations, generation and transmission facilities and contracts for supply to meet a portion of its demand requirements.

British Columbia has approximately 14,500 MW of dependable generation capacity.[10] BC Hydro's generation capacity is approximately 11,000 MW. There is also approximately 3,500 MW of capacity provided by Alcan, Teck Cominco Limited, independent power producers, FortisBC and industrial on-site self-generation.

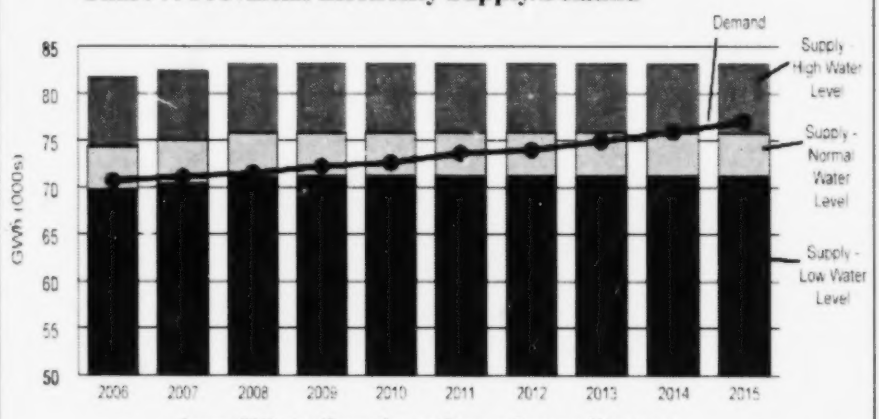
Chart 6: BC's Installed Electricity Capacity, 2004


BC Hydro Coastal 10.1%
Others 22.6%
BC Hydro Other Thermal 0.7%
BC Hydro Columbia River 36.3%
BC Hydro Burrard Thermal 6.4%
BC Hydro Peace River 24.0%

Sources: BC Ministry of Energy, Mines and Petroleum Resources; BC Hydro data

The electricity supply challenge facing British Columbia is complex and best described through a series of charts. These charts follow and outline BC's electricity supply, the overall supply/demand outlook, BC's current dependency on net imports of electricity and the erosion of BC's surplus in electricity, and the fact that only concerted efforts to increase supply can restore that surplus.

Chart 7: Provincial Electricity Supply/Demand



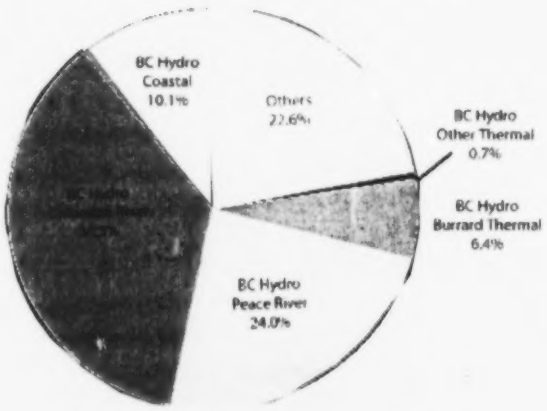
Sources: BC Ministry of Energy, Mines and Petroleum Resources; BC Hydro data

Electricity capacity in British Columbia is shown in Chart 6. BC Hydro has more than three-quarters of the capacity in the province and most of that comes from the two river system of the Peace and Columbia. The two-river system has also given BC a price advantage in electricity; along with Manitoba and Quebec, British Columbia has relatively inexpensive electricity compared to most other jurisdictions in North America. This price advantage has given British Columbians a false sense of security, however, as new sources of electricity supply are more expensive than what we pay today for electricity generated from the two-river system.

[10] Consistent with industry practice, capacity is shown in megawatts (MW) and energy is shown in gigawatt hours (GWh).

British Columbia has approximately 14,500 MW of dependable generation capacity.[10] BC Hydro's generation capacity is approximately 11,000 MW. There is also approximately 3,500 MW of capacity provided by Alcan, Teck Cominco Limited, independent power producers, FortisBC and industrial on-site self-generation.

Chart 6: BC's Installed Electricity Capacity, 2004



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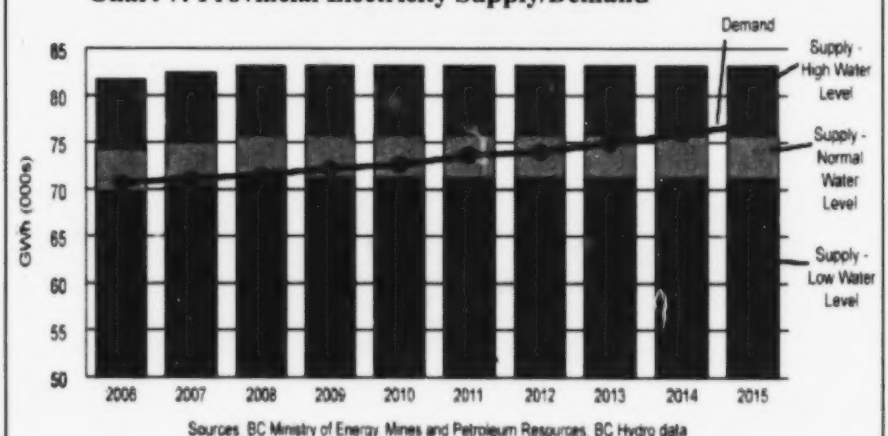

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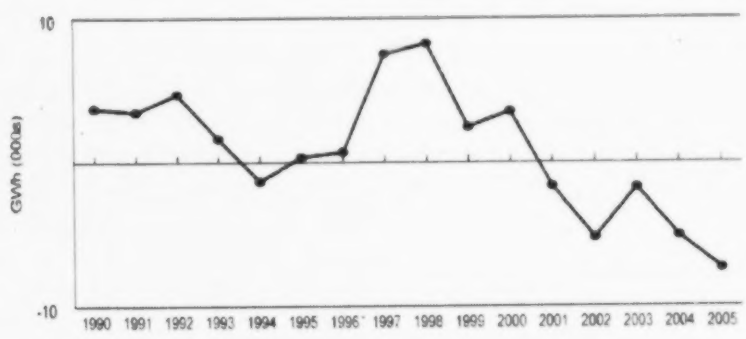
[10] Consistent with industry practice, capacity is shown in megawatts (MW) and energy is shown in gigawatt hours (GWh).

Chart 7 shows the provincial electricity supply/demand outlook to 2014/15. Supply varies in part as water levels change given that the majority of overall generation is from hydroelectric dams.

The striking feature of the supply/demand outlook is that there is very little excess capacity except in high water years. Moreover, the outlook makes no provision for exceptionally strong demand and assumes conservation and supply additions that have yet to be secured. Current population projections call for British Columbia to add a city the size of Kamloops each year; this growth will put significant pressure on the demand for electricity in the province. In addition, climate change alone requires the need to plan for greater variability in water levels.

Finally, the demand/supply outlook does not fully reflect recent substantial increases in natural gas prices, which are market determined, and the resulting substitution effect. Electricity prices are relatively low in British Columbia and are set by the BC Utilities Commission rather than in response to market demand. Therefore, high natural gas prices will result in consumers choosing cheaper electricity rather than natural gas for their energy needs. If natural gas prices remain high, and electricity prices remain low, the result will be a significant increase in demand for electricity in British Columbia.

Chart 8: British Columbia's Net Imports and Exports of Electricity



Sources: Ministry of Energy, Mines and Petroleum Resources; BC Hydro data

Chart 8 provides another indication of electricity supply conditions in British Columbia. Since 2000, the province has been a net importer of electricity. These net imports met approximately 12 percent of domestic needs for the year ending March 31, 2004, and were from Alberta and Washington State. Powerex, a BC Hydro subsidiary, trades in electricity and these net imports reflect purchases that exceeded sales. These net imports are almost equivalent to the capacity of Burrard Thermal[11] and the contingency reserves that BC Hydro is legally required to maintain.[12] BC Hydro claims it is getting good prices on these net imports as the electricity is purchased at off-peak times.

[11] Burrard Thermal is owned by BC Hydro. As shown earlier in Chart 6, it has over 6 percent of electricity supply capacity in the province, producing electricity with natural gas-fired turbines. It is the main supply back up in the BC Hydro system and has the advantage of being located in the Lower Mainland close to the bulk of provincial demand. Burrard Thermal's useful life will end in 2015. Given its importance to the BC Hydro system, it will have to be extended or replaced, either of which will require a major capital expenditure.

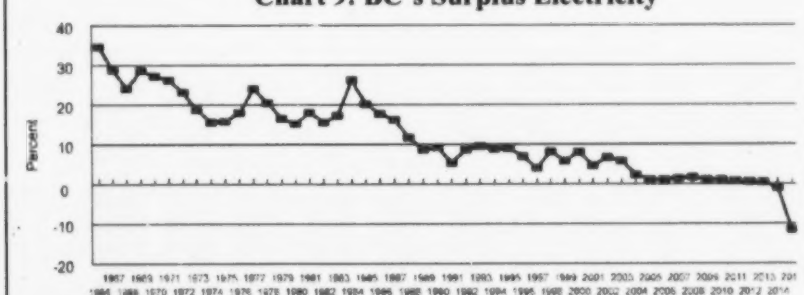
[12] This is a contractual requirement of the Western Electricity Coordinating Council that includes western provinces and states.

This import strategy without greater back up supply is risky, however. If imports are not available for whatever reason, BC Hydro must turn to Burrard Thermal to meet some of its needs. This takes time to accomplish and even then Burrard Thermal cannot fully displace the net imports being purchased today. In addition, contingency reserves that are a legal requirement do not provide a long-term solution. Moreover, as shown earlier in Chart 7, in periods of low water levels, which are hard to predict, electricity supply is further constrained.

Chart 9 provides further evidence of the electricity supply shortage in the province. There have been no major electricity supply additions in the province since 1984. As shown in Chart 9, BC's electricity surplus has now shrunk to zero. This reflects the fact, discussed earlier with respect to Chart 8, that net imports of electricity are now roughly equal to the capacity of Burrard Thermal and the contingency reserves that BC Hydro is legally required to maintain. This zero surplus becomes a deficit in a few years. It becomes a large deficit in 2015 when Burrard Thermal comes to the end of its useful life.

Put simply, British Columbia is no longer self-sufficient in electricity. It is now a net importer of electricity. That import dependency will increase in low water and/or high demand years. Moreover, import dependency will increase sharply if there is no new electricity supply. It takes careful planning and execution to increase the supply of electricity. We have very limited experience in doing so in the last two decades. The complexity and lead times required for project development should not be understated given the many interests that need to be considered and balanced in the process.

Chart 9: BC's Surplus Electricity



Sources: Ministry of Energy, Mines and Petroleum Resources, BC Hydro data

There is one overriding electricity policy issue facing BC. It is as follows: **"Should the province be self-sufficient in electricity or rely on imports?"** Self-sufficiency[13] in electricity in BC is not being addressed fully by government and industry. The benefits of self-sufficiency in electricity have not been outlined. The risks of not being self-sufficient in electricity have not been clearly stated. The result is a general complacency around electricity supply that is unrealistic and potentially costly for every British Columbian. This complacency has been reinforced by confusing messages on electricity supply from BC Hydro (refer to Strategic Imperative 6).

[13] Self-sufficiency in this context is defined as BC having the ability to generate enough electricity to meet provincial requirements without having to rely on imported electricity. We may choose not to use our own sources of electricity at all times, if we can get a cheaper source of supply from Alberta or Washington State for example, but having the ability to choose the best source of supply is a different matter than becoming increasing reliant on imports because we can't produce enough here.

Many British Columbians think we are net exporters, not net importers, of electricity.[14] Many also feel we have abundant and relatively inexpensive sources of electricity and that bringing on new sources of relatively inexpensive electricity can be done quickly and easily. There is also a sense in some quarters that all sources of electricity supply carry similar price and reliability characteristics. None of these assumptions are valid and left unchallenged have the potential of removing BC's historical advantage in electricity.

There are many benefits to being self-sufficient in electricity. We have many potential electricity sources that have the potential to provide reliable and competitively priced electricity to meet the needs of a growing province. These include Site C on the Peace River,[15] many run-of-river projects throughout the province which collectively have the potential to add significantly to electricity capacity, natural-gas fired generation,[16] coal-fired generation,[17] geothermal energy,[18] and many types of alternative energy sources including wind and tidal.[19] BC has a highly diversified portfolio of energy sources in use and available in the future. Self-sufficiency provides households and businesses with greater certainty and reliability of electricity supply since the sources of supply and their transmission are subject to BC policies and safeguards, including consideration of price and environmental impact. A net importer in electricity is a price taker and has no influence over the source of electricity supply.[20]

Self-sufficiency in electricity creates thousands of high-income jobs in the province in construction, ongoing operations and support services. In the past, successful hydroelectric developments on the Peace and Columbia Rivers created good quality jobs. There are also costs of developing electricity generation to meet our own domestic needs. New generation must be financed and the sums involved are in the billions of dollars and there are risks of project cost over-runs. There are environmental impacts involved in electricity generation of any type and these impacts must be addressed and mitigated where possible. Generation usually requires transmission to get electricity to market and developing generation in remote locations carries significant transmission costs. Building electricity capacity in excess of domestic needs can be costly unless export markets have demand for the surplus electricity produced and are readily accessible through existing transmission lines.

The risks of not being self-sufficient in electricity must also be addressed. Import sources may not always be available or inexpensive. Alberta and Washington State have been meeting our net

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[14] They are also generally unaware that back up capacity (using Burrard Thermal), should net imports be unavailable, is limited in both capacity and useful life.

[15] Site C warrants careful assessment. If developed it constitutes approximately 6 percent of current electricity capacity in the province which is a significant potential increase to supply.

[16] Recognizing that natural gas - fired generation has emission benefits over coal-fired or oil-fired generation and that British Columbia has a competitive advantage in natural gas. Of course the relative attractiveness of gas-fired generation will also depend on the prevailing market price for gas.

[17] Recognizing that there have been major improvements in coal burning technology, but the impact of emissions on the environment is a continuing concern.

[18] Several buildings in Vancouver in particular are self-sufficient in electricity using geo-thermal energy sources.

[19] Other jurisdictions, notably Denmark, have been leaders in developing wind generation. British Columbia has great potential in this regard and BC Hydro has been actively promoting clean technology and a larger role for alternative energy. It is now important to deliver on this policy direction.

[20] Much of what British Columbia imports today is derived from coal-fired generation.

import needs in recent years but their economies and demand for electricity are growing. As a result, the availability of low-cost electricity at off-peak times is not guaranteed.

Many BC businesses, including pulp and chemical firms and mines, are dependent on significant amounts of competitively priced and highly reliable electricity. These industries employ thousands of British Columbians directly and indirectly and therefore any erosion in their competitive position has negative consequences for the provincial economy. All sectors of the economy, including households, can be very negatively affected when electricity becomes unreliable and expensive. Recent experiences in California and Ontario should be sufficient warning in this regard.

New electricity generation takes long range planning, a sound and comprehensive basis to assess all reasonable alternatives, and fair and effective means to address impacts on the environment and communities. It also requires clear communication with the public on why new generation is needed and the process to be followed in development. Any assumption that new generation can be developed easily or quickly needs to be tested against the fact that BC Hydro has not had a major incremental increase in electricity supply since 1984. Self-sufficiency in energy is not easy to achieve; nor is it easy to maintain when economies start to grow rapidly.

On a related matter, it is important for energy resources to be managed by the provincial government with a view to their best use on behalf of all British Columbians. There is growing concern that many energy related projects in the province, particularly small scale electricity generating projects, are being vetoed at the regional or local level of government based on zoning by-laws. Regional and municipal governments do not have the responsibility for ensuring adequate energy supply is available to all British Columbians, and while it is appropriate for them to be participants in the review and approval processes for any energy project, the provincial government must continue to be the final decision maker.

For a province with an abundance of energy sources that is striving for sustained economic growth and creating quality jobs, it seems obvious that a policy of electricity self-sufficiency must be endorsed and implemented as quickly as possible. This will require policy action on the part of government and a coordinated effort for its implementation, the latter demanding the leadership of BC Hydro and the cooperation and participation of many stakeholders.

Much of what is outlined above has been said before but in a manner that has called no one to action or account. Times have changed: British Columbia has a compelling need to be self-sufficient in electricity and government and its agencies along with an engaged and cooperative private sector need to get on with the job. Moreover, the public needs to get informed on the facts and, in turn, hold its government and the electricity sector accountable. BC is not yet in a crisis with regard to its supply of electricity, but it does have serious planning challenges and if these challenges are not met in a timely manner a supply crisis will likely follow.

Box 4:
Opportunities for Additional Electricity Supply

BC Hydro projects that British Columbia will require 30,000 GWh of additional electricity supply over the next two decades, 15,000 GWh in each decade. Additional electricity supply is needed for all of the reasons cited earlier in this report. If BC Hydro's assumptions hold, the province will have a small surplus in electricity by the end of 2015 and a slightly larger one by 2025. Self-sufficiency in electricity will be achieved but the surplus will be modest by historical standards.

BC Hydro's focus is on demand side management (i.e. conservation and efficiency), small run-of-river hydro projects, big Hydro (i.e. Site C on the Peace River), biomass and wind. Coal-fired generation and gas-fired generation do not appear as high on BC Hydro's priority list. Coal-fired generation must satisfy cost and environmental considerations. Gas-fired generation is considered risky given the large increases in natural gas prices that the North American market is experiencing. How BC Hydro will acquire the 30,000 GWh required will be made public in late November this year when its latest resource plan is unveiled.

There are several issues with the BC Hydro proposed resource plan, as we understand it. The forecast calls for average annual increases in the demand for electricity, after conservation and efficiency measures are accounted for, of just over 1 percent. This is less than half of historical demand increases and makes little allowance for a BC economy that is now positioned for sustained real growth. In addition, BC Hydro's electricity prices are likely to remain much more attractive than the price of natural gas, another factor that will increase the demand for electricity.

We understand that consumers don't want to see BC Hydro overbuild but the risk on the demand side suggests the opposite; we may not meet demand and therefore may not be self-sufficient in electricity. Furthermore, there is potential to export electricity so the cost to consumers of building too much capacity appears low. In fact, net exports can be expected to generate economic benefit for the province. Until 2001, BC Hydro was a net exporter of electricity.

Increasing the supply of electricity also provides some real challenges. Additional conservation and efficiency measures have yet to be secured but are expected to reduce the amount of new electricity required by 5,000 GWh in each of the two decades or one-third of the 30,000 GWh required over the next 20 years. BC Hydro is expecting to secure 10,000 GWh of electricity in the first decade from small run-of-river projects, biomass and wind. There are many small run-of-river projects and BC Hydro has identified a total potential of 8,000 GWh of electricity from this source. Very few run-of-river projects have been approved to-date, however, and the approval process appears complicated, particularly since in some areas regional districts have become involved. For biomass, BC Hydro has identified a potential of 2,000 GWh of electricity from pulp and paper facilities alone. Several wind possibilities have also been identified. Run-of-river and wind are, of course, intermittent sources of supply.

Early in the second decade, Site C on the Peace River is an important possibility as it can generate 4,600 GWh of electricity. Other options in the second decade, beyond additional conservation and efficiency measures, again focus on small run-of-river projects, biomass and wind. To date there has been very little public discussion of other major hydroelectric possibilities, whether that is on the existing two-river system or on a new river. A strategic consideration for policy makers is to plan for safe, clean and reliable sources of electricity to meet BC's requirements over the longer term.

The concerns raised above lead to three conclusions. The demand/supply profile for electricity for the next two decades carries substantial risks, most of which suggest it will be challenging to become self-sufficient in electricity. Either demand is more robust than suggested or supply as planned does not materialize, or both. Being self-sufficient in electricity is an important goal. Furthermore, as discussed earlier, there is a good export market for electricity that generates real economic benefits for BC.

The second conclusion is that BC Hydro must improve its information on the demand forecast and supply addition preferences. Governments, regulators, project proponents and British Columbian citizens must be given sufficient information to understand the demand forecast, the cost/benefit trade-offs among supply options and the inherent risks involved, and new sources of supply that may be emerging. BC Hydro should also challenge other sources of information that may be misleading the public debate, such as the impacts of Site C on the Peace River. BC Hydro should present the facts in a timely fashion and thereby improve the public debate. Only then can BC Hydro mobilize a plan of action with public support that meets BC's electricity requirements.

The final conclusion is that government should provide regulators and BC Hydro itself with clear policy guidance on the need to increase electricity supply.

Source: Ministry of Energy, Mines and Petroleum Resources based on BC Hydro data

Recommendations

To become self-sufficient in electricity:

- The provincial government must establish a clear provincial policy that BC's goal is to be self-sufficient in electricity. British Columbia should be in a position to meet its own electricity needs. This policy should include provision for the province to be a net exporter of electricity and also promote the trading of electricity where it is cost effective to do so.

- The provincial government and BC Hydro must explain clearly the need for additional supply. This case pertains to the need for greater domestic security to meet expected population and industrial growth in coming years. It also pertains to the benefits of export and the significant risks of being import dependent;

- BC Hydro must call for competitive and comprehensive proposals for electricity supply recognizing the long lead times involved to build facilities and the variety of potential projects that must be considered, from small run-of-river projects to Site C on the Peace River;

- BC Hydro must provide greater certainty and predictability on how new electricity generation projects will be included in BC Hydro's electricity supply, including defining clearly what qualifies as clean energy and the contractual arrangements involved; and,

- The provincial government should foster greater public-private partnerships in energy in order to increase investment in the sector and transfer project risk from the public sector to the private sector.

Strategic Imperative 4 - British Columbia, Alberta and the US Pacific Northwest can Benefit from their Joint Energy Interests

British Columbia and Alberta have joint energy interests. These interests include the development and transmission of electricity and the transportation of oil and natural gas for domestic use and export. The development of the Alberta oil sands and the need to get both oil and electricity from the development to market provide an unparalleled opportunity for cooperation and resulting benefit between the two provinces.

Transportation systems to get energy to markets in the Pacific Northwest are also critical to British Columbia. Approximately 50 percent of BC's natural gas is exported to Washington and Oregon and transportation systems for oil and natural gas are built incrementally as demand dictates. Transmission systems for electricity were built decades ago and now need upgrading and new investment to meet growing demands in British Columbia. They are also required to take advantage of the trading opportunities between British Columbia and Alberta and Washington State, as the regional electricity supply becomes more integrated through the application of common standards and rules of

operation. British Columbia also needs to position itself to benefit from opportunities related to pipeline development in Alaska and the Northwest Territories

Description and Analysis

Alberta

BC and Alberta enjoy a high degree of business connection, labour mobility, and general social and family inter-action. This is the result of a lengthy border between the two provinces, a big oil and gas industry in Alberta, a significant natural gas industry in British Columbia, and the need for Alberta products to get to market through BC highways, rail lines and ports. There is also electricity inter-dependency between the two provinces as described in Strategic Imperative 3.

The importance of the BC/Alberta relationship is often taken for granted. There are developments internationally and regionally that have significant implications for the BC/Alberta relationship.

Box 5:

Alberta Oil Sands

The worldwide demand for oil is more than 80 million barrels per day and is projected to grow significantly in the next 25 years. The growth in global demand for oil comes at a time when the supply from relatively cheap conventional sources is declining, and reserves are not being replaced with new discoveries. However, the world has over twice as much supply of heavy oil and bitumen than it does conventional oil.

Canada alone has, by some estimates, 175 billion barrels of bitumen reserves that can be processed with today's technology, making it second only to Saudi Arabia in proven oil reserves in the world, acknowledging that less than the 175 billion barrels may be recoverable. Alberta has the major Canadian oil sand deposits and these are located in three areas of that province: Athabasca; Peace River; and, Cold Lake.

Oil sands that cannot be mined require steam injection for oil recovery. Steam injection requires large amounts of energy and water (and results in excess steam production that can be used to generate electricity).

Major energy companies are already making large multi-billion dollar investments in the Alberta oil sands with significant increases in oil production expected before the end of this decade. Capital expenditures are expected to average $5 billion per year through 2009. Employment today stands at 140,000 persons, up from 30,000 persons just nine years ago. Further major employment growth is underway.

British Columbia and Alberta are competing in world markets. They are provinces that depend heavily on commodity prices and exports for wealth creation. The ability to get products and services to market is an important factor. In many ways British Columbia holds the key to getting those products and services to market. British Columbia and Alberta electricity for export to Washington State is transmitted through British Columbia interties. Coal exporters from the two provinces use BC ports, which provide the gateway to Asia. Alberta oil is transmitted through British Columbia to Vancouver and the United States.

In the natural gas industry, British Columbia relies extensively on Alberta-based producers and service companies to develop the natural gas fields in BC's northeast. Some of BC's natural gas is transmitted east through pipelines owned by Alberta-based companies to meet natural gas needs in eastern Canada and the United States. In addition, British Columbia relies on imports from Alberta for most of its refined oil needs.

These are only a few examples of economies that are inextricably linked.

A significant regional development is the Alberta oil sands (see Box 5). The Alberta oil sands, if developed as currently planned, will produce up to five million barrels of oil a day in a world now consuming 80 million barrels of oil a day. This oil will need to get to market and British Columbia offers port capability in several locations. That is why oil pipeline companies are analyzing existing and new pipeline options for Vancouver and for Prince Rupert and Kitimat.

The development of the Alberta oil sands will put the Alberta government in a strong surplus position fiscally for years to come remembering that Alberta is already first in Canada in per capita income and without a provincial sales tax or provincial debt. Alberta's coming wealth will create a potential threat to British Columbia as better wages, take home pay, health services and access to education in Alberta are likely to put enormous pressure on the British Columbia labour market, particularly in the area of skilled trades and engineers.

The Alberta oil sands are demanding thousands of workers including large numbers of engineers and skilled tradespersons. These skill sets are in short supply worldwide. Moreover, they are the very skill sets British Columbia needs to grow its energy sector and to complete a wide array of transportation projects now underway in the province. To protect its interests, British Columbia needs to forge a joint energy labour strategy with Alberta. Otherwise, the risk is that Alberta will simply bid the required labour away, including labour from British Columbia, with its newfound wealth.

On the other hand, given Alberta reliance on BC highways, transmission lines, oil pipelines, rail lines and ports to get products and services to market suggests that the two provinces should be working jointly to develop this infrastructure in the most efficient way possible to the benefit of both jurisdictions. This benefit may include the development of infrastructure in the northwest of the province that will facilitate exports to other parts of the world. The demand for British Columbia and Alberta commodities is growing sharply. Both provinces would be wise to diversify their export markets, which in recent years have been primarily the United States.

Just as British Columbia is well advised to strike a joint labour strategy with Alberta to protect British Columbia interests, Alberta is well advised to develop a joint export strategy with British Columbia to protect Alberta interests.

In addition, British Columbia should investigate the possibility of expanding its capacity in refining oil, as the process requires skilled labour. The Alberta oil sands will be increasing oil production significantly and shipping most of that production to market, in part through existing and new oil pipelines that cross British Columbia.

Washington State and the US Pacific Northwest

BC's natural gas transmission pipelines provide access to export markets east and south of the province. Approximately half of BC-sourced natural gas is consumed in the United States, mainly in the US Pacific Northwest. This has been the case for more than 50 years.
Transmission of oil and natural gas is facilitated by the following:

- Regulated pipeline companies secure contracts from shippers of oil and natural gas. Once these contracts are in place, pipeline companies seek regulatory approval to expand pipeline capacity, if needed, with consumers ultimately paying for the cost of transmission; and,
- Private capital finances transmission expansion thereby avoiding the public sector trade-offs between funding health care and education capital and funding energy capital.

Over the years, pipeline transmission of oil and natural gas has served the province well. Transmission has generally been reliable, safe and relatively cost effective given the long distances to market. It has also expanded as market demand dictates.

For Washington and Oregon states, BC natural gas has played a key role in meeting their energy needs.

The transmission of electricity in British Columbia is a more complicated story. There are 18,000 km of transmission lines across the province owned mainly by BC Hydro and FortisBC with the new British Columbia Transmission Corporation operating BC Hydro's transmission system. The infrastructure is old and significant capital expenditures are required if reliability is to be maintained and capability enhanced.

British Columbia is also becoming integrated into a regional electricity market crossing both provincial and international boundaries. There are transmission interties with Alberta and with Washington State. These interties are important to all three jurisdictions with the Washington state intertie being the sole means of getting BC and Alberta electricity to Washington state or electricity from Washington state to British Columbia or Alberta.

Alberta has been concerned with its ability to access BC transmission in order to get its electricity to Washington state. It has considered building its own transmission system to Montana. The development of the Alberta oil sands is anticipated to lead to the generation of large amounts of electricity from the excess steam resulting from oil sands production. Alberta will require a market for this electricity and BC and the Pacific Northwest should be positioned to benefit from this opportunity.

Consequently, from a BC perspective, there are good reasons to strengthen the BC/Alberta and BC/Washington state interties, and in the process strengthen the BC and Alberta economic relationship. The challenges for the transmission of electricity in British Columbia (or to or from the two neighbouring jurisdictions) are as follows:

- There does not appear to be a comprehensive plan of action for electricity transmission that has been communicated to the public;
- The required upgrades and expansions are significant;
- Crown corporations are owned by the province and therefore there are constraints in securing public sector financing, particularly when the province has large capital demands in health care and education;

- Generators of electricity usually require transmission access and the rules for access are by nature complex; and,
- Transmission corridors are not always welcome in communities. It is becoming increasingly difficult to build or upgrade transmission in and around communities, yet this is necessary to get electricity to market.

Alaska and the Northwest Territories

Active planning is underway for a new natural gas pipeline from Alaska to the lower 48 US states. It would most logically pass through the Yukon Territory and British Columbia on its way southeast. British Columbia must engage in discussion with the governments and producers involved to ensure that it takes advantage of any opportunities for the province in the construction and operation of the pipeline and the processing and trading of natural gas.

Similarly, negotiations are ongoing between First Nations, the NWT government, the Alberta government, the federal government and interested producers with regard to the construction of a natural gas pipeline from the Mackenzie Valley. British Columbia needs to be an active participant in these negotiations to position Northern BC as an option for the terminus of the Mackenzie Valley pipeline in order to benefit in the same manner as outlined above for the Alaska pipeline.

Northeast BC is currently the start of the Duke Energy natural gas pipeline that runs southwest to the Lower Mainland and connects with the US Pacific Northwest. It is also the starting location of the Alliance pipeline that runs to the eastern US. If the two new northern pipelines were routed to northeast BC, there is the potential to develop a natural gas trading hub in the northeast. Such a centre would be a location for pricing and trading natural gas and in the process signal to North America that the British Columbia natural gas market is large, competitive and growing. There would also be potential to capture higher value liquids from natural gas. The BC government must actively market the benefits of the BC option to the parties engaged in building Alaska and Mackenzie Valley pipelines.

Recommendations

- Establish a British Columbia/Alberta joint strategy, co-sponsored by the two energy ministers, to do the following:
    - Attract and retain skilled labour for the energy sector in both provinces, including for the regulation of the sector;
    - Identify significant energy opportunities of mutual benefit (for example, manage the electricity systems in the two provinces to benefit both jurisdictions);
    - Start planning for utility corridors given the need to move BC and Alberta energy to foreign markets;
    - Begin joint planning with BC Port Authorities on how best to strengthen and expand BC ports to move BC and Alberta energy to external markets;

  - Inform the two provincial Cabinets of action required by government to grow the energy sector (for example, the need for common standards to facilitate the movement of large equipment); and,
  - Engage the private sector in developing regulatory improvements (for example, the design of outcome-based regulation).

- The provincial government, through BC Hydro, the BC Transmission Corporation, and the Centre for Energy should explain to British Columbians the regional interdependence in electricity transmission and in oil and natural gas transportation and that this regional interdependence requires reliable and efficient transmission and transportation so that the public will be more supportive of new transmission and transportation projects;

- The provincial government needs to ensure that the BC Transmission Corporation has the plan and the resources to upgrade and expand the BC transmission system. This is important within British Columbia because more energy transmission is required especially near and in the Lower Mainland as its population grows; and,

- With regard to opportunities in Alaska and the NWT, the BC government needs to maximize benefits to British Columbia:

  - British Columbia, Yukon and Alaskan governments must strike a trilateral economic arrangement focusing on the potential transportation of Alaskan natural gas through the Yukon and British Columbia;

  - British Columbia and the Northwest Territories must reach a bilateral agreement that focuses on the gathering, processing and transportation of natural gas from the NWT; and,

  - British Columbia should market Northern BC as the best choice for the terminus of the anticipated Alaska and Mackenzie Valley pipelines. This will position Northern BC to become the location of a major trading hub for natural gas.

Strategic Imperative 5 - Conservation and Energy Efficiency are Essential

Climate change is the most prominent environmental and economic global issue of our time. Air quality is a growing health concern for British Columbians, especially in the Fraser Valley. BC energy demand exceeds supply, but it is increasingly difficult for new, large electricity generation, transmission or natural gas pipeline projects to get public approval in BC due to the required trade-offs in lower air quality due to higher emissions, environmental impact, and costs. We must reduce energy consumption and emissions. Energy conservation, energy efficiency, and alternative energy sources are the only way to achieve this imperative.

Description and Analysis

Energy conservation and energy efficiency are separate but related concepts. Energy conservation is achieved when energy waste is reduced or eliminated; for example, turning off the lights conserves energy. Energy efficiency involves getting the most productive use from the energy used. For example, a new furnace that produces more heat with the same amount of energy is more efficient than an old one. Conservation implies using less, while efficiency implies using specific technologies and best practices to do the same or more with less.

Demand-side management, which pertains to conservation and efficiency, is used primarily by public utilities to modify the amount and timing of electricity and natural gas use by consumers.

Conservation and energy efficiency are the equivalent of adding to our supply of energy. They can delay or avoid the need to build new supply sources such as hydro dams or gas-fired generators, or to increase imports of electricity.

In its discussion with many parties the BC Progress Board heard a plethora of excellent ideas for energy conservation and efficiency. Many of these ideas have been acted upon by utility companies, governments, municipalities and industry associations in other jurisdictions and in British Columbia. The major challenge appears to be how to increase participation, essentially by the public, in the options provided to them by these energy and service providers. Incentives and awareness for the consumer are the biggest deficits. The following are some examples of measures that increase energy conservation and efficiency.

Market Based Pricing

BC Hydro's pricing of electricity, as approved by the BC Utilities Commission, does not disclose the higher cost of adding new electricity supply. BC consumers enjoy low electricity rates compared to other North American jurisdictions because of the historic lower cost of electricity from the dams on the Peace and Columbia Rivers. The cost of adding new electricity supply is much higher but it is blended into the low cost electricity from the "heritage" dams. This pricing approach results in inaccurate price signals for the consumer. It reduces the motivation to conserve electricity and is misleading with regard to the real cost of adding new sources of supply. Accurate price signals are the best means to inform consumers of the cost of their electricity. BC Hydro has applied to BCUC to modify its pricing for industrial users and charge a "stepped rate," which means a higher rate for power consumption beyond a certain amount. BC Hydro should apply for stepped rate pricing for all customers including residential customers.

Time-of-Use Pricing

Time-of-use pricing provides an incentive for electricity consumers to move their consumption from peak demand times to lower demand times by charging a lower price for power use at that lower demand time. Customers have an incentive to alter their energy use behaviour, including shifting use from evening to night time or afternoon, reducing use or buying energy-efficient equipment. A shift that was on a large enough scale would reduce the amount of electricity BC

Hydro had to supply at daily peak demand times. FortisBC offers time-of-use pricing for all of its customers in the BC Interior with a significant difference in rates between high demand and low demand times.[21]

Green Energy

FortisBC also offers customers the option of signing up to get all or part of their electricity from "green" power sources including small run-of-river hydro, wind, solar, geothermal and biomass. Customer support for these green energy sources makes it possible to further develop these alternatives to traditional generation technologies and if used on a large enough scale could replace the need to build more traditional generating capacity.

Net Metering

Net metering allows utility customers to generate their own electricity through conventional or alternative energy generation systems (e.g. small hydro, solar, biomass, wind power) and sell any excess energy back to the utility provider which credits them for the amount of energy generated. The customer can use that amount of power at a later date and, at the end of the billing year the utility pays the customer for any remaining credit. If this practice were wide spread, particularly among large industrial customers, it would make more efficient use of existing energy sources and could help reduce the need for BC Hydro to add new power generation sources. BC Hydro has offered this option to its customers since 2004. It has had better success compared to other jurisdictions but still has only a handful of participants in the program. Customer incentives and awareness are needed to expand the program.

Energy Efficiency for BC Buildings

The provincial government has developed this strategy in consultation with an industry advisory group. The strategy sets goals for increasing the energy efficiency of buildings in the province. The measures are voluntary at present. The government plans to legislate energy efficiency requirements that will be phased in over a number of years. As an example of the goals, the federal government's EnerGuide for Houses is a 1-to-100 rating, with higher ratings demonstrating higher energy performance. New homes in BC average a rating of 71 and 76 and older homes range from an average of 58 to 68 depending on their age. The strategy sets the target of a rating of 80 by 2010 for all new homes, and a decrease in energy consumption of 17 percent in 12 percent of existing buildings. Determining how to provide incentives and information to increase the public's willingness to change their behavior and make the right choices is the key to the strategy meeting its targets for energy savings and greenhouse gas reduction.

[21] For example, winter on-peak rates are approximately 14 cents per KWh and off-peak rates are approximately 3 cents per KWh. See www.FortisBC.com

Box 6:

EnerGuide 80 House

A typical **EnerGuide 80 house** would have the following cost-effective features:

- Integrated heating/ventilation systems, Energy Star qualified natural gas furnaces, boilers or heat pumps;
- Advanced framed 2x6 walls with full insulation or 2x4 construction with wall insulation and exterior insulated sheathing;
- Full height basement insulation and increased attic insulation for electrically heated homes in Northern BC;
- Low-emissivity windows (with insulated spacer filled with argon gas for the interior of BC);
- Increased air tightness of the air/vapour barrier and heat recovery ventilators;
- Energy Star qualified fans, and variable speed furnace blower motors; and
- Programmable thermostats.

Source: "Energy Efficient Buildings: a Plan for BC" on Ministry of Energy, Mines and Petroleum Resources website at www.gov.bc.ca

Federal Greenhouse Gas Reduction Strategy

In April 2005 the federal government introduced Project Green to honour its climate change commitment. Canada plans to spend $10 billion from 2005 to 2012 on a number of initiatives to reduce greenhouse gas emissions. These include: a Climate Fund; a Partnership Fund; Greenhouse Gas Reduction Programs including an extension of the EnerGuide for Houses Home Retrofit Incentive Program; Renewable Energy initiatives with the goal of quadrupling wind power production over 15 years to produce electricity equivalent to the needs of one million homes; tax incentives to promote renewable energy and energy efficiency; consumer action programs; automotive industry strategies; and a Greening Government plan.[22] Project Green is an opportunity for the BC government, utility companies and businesses to develop alternative energy sources and energy conservation and energy efficiency technologies for domestic use and for export.

British Columbia can be doing many things to conserve energy and be more efficient in energy use. Such action will lower consumer costs and the environmental impact of consumption. It will also delay the requirement for new sources of supply and give us additional planning and development time, recognizing that BC Hydro has already accounted for some degree of increased energy conservation and efficiency in its forecasts.

Recommendations

- The provincial government should implement its Energy Efficiency for BC Buildings strategy with a strong emphasis on, and funding for, public education, awareness and incentives to change behaviour;

[22] See www.climatechange.gc.ca

- The provincial government, through the BC Utilities Commission should direct BC Hydro to introduce pricing of electricity that sends the correct signals to all consumers for their energy decisions, mindful of the government's pricing policy with respect to heritage assets;

- BC Hydro and FortisBC should increase public awareness and greater accessibility to the energy conservation and energy efficiency options they offer and establish ambitious targets for public participation in these options and the resulting energy savings; and,

- BC businesses and utilities must take advantage of the funding offered by the federal government as part of its Kyoto Protocol greenhouse gas reduction obligations to develop new business opportunities in conservation, energy efficiency, and alternative energy sources for domestic use and for foreign markets.

Box 7:

Pine Beetle Killed Softwood is a Source of Energy

In the British Columbia Interior, vast expanses of pine trees have been killed by the Mountain Pine Beetle. The infestation is continuing to spread and the province has an overwhelming, and growing, amount of dead softwood on its hands.

A potential use for beetle-killed wood is energy generation. Two viable methods for using this wood as an innovative and environmentally friendly fuel source are:

Wood pellets: Beetle-killed wood can be dried and compressed into wood pellets that can be used as fuel for everything from highly efficient wood stoves for home heating to industrial scale power generation. BC has a number of wood pellet production facilities. At present, the pellets are being exported to Europe where it is considered a "carbon-neutral" green fuel that assists countries in reaching greenhouse gas reduction targets. Wood residue is designated as a BC Clean fuel for electricity generation but there is very little use of the product within the province. One reason for this may be a low level of consumer awareness of the benefits of wood pellets. The provincial government could help increase awareness and use of wood pellets by exempting wood pellet burning stoves and generators from provincial sales tax.

Liquid fuels: Beetle-killed wood can be turned into liquid fuels such as ethanol, bio-diesel and bio-oil. Ethanol can be used as a gasoline additive for vehicular use, with a lower emission level. Bio-diesel can be used in place of traditional diesel for use in vehicles. It can also be used as a low emission alternative in diesel generators, including generators used for electricity generation in communities that are off the provincial electricity transmission grid. The technology for using softwoods for these liquid fuels is being refined and there is no commercial scale production of these products yet in BC.

Access to adequate supplies of beetle-killed wood is essential for these energy alternatives to become economically viable. There is enough wood to supply a major energy production project for over 20 years but the wood is spread over 7 million hectares and adequate transportation and storage is not in place at the present time. Innovative partnerships between governments, the forestry industry and energy industry is necessary to use beetle-killed softwood in a manner that makes good use of the wood and assists BC in meeting its energy requirements in a way that has low environmental impact.

Strategic Imperative 6 – The Public Requires Information About the Reality of BC's Energy Supply and Demand So We Can Make Informed Choices

The BC public is not well informed on energy issues. Orderly development of an energy sector requires public knowledge and participation.

Description and Analysis

BC has had the luxury of not experiencing an electricity supply crisis, unlike other jurisdictions such as California or Ontario in recent years. It has also enjoyed stable prices for electricity due to the reliable supply from, and blended pricing used by, BC Hydro. As a consequence, energy related issues are rarely front and centre in public awareness in the province. When they have assumed a high profile it has generally been due to opposition to projects that add to electricity supply, such as the Duke Point or Sumas II generating plants. With the current level of electricity supply available to British Columbians, demand will increasingly exceed supply. British Columbians have to make difficult decisions about how to meet this increasing demand. It is essential to ensure a level of public information and therefore awareness that allows British Columbians to make realistic choices.

BC Hydro is seen as the pre-eminent authoritative source of information with regard to electricity supply in the province. Consequently, BC Hydro is the most effective vehicle for educating the public about the circumstances and the choices that must be made.

BC Hydro's message has been confusing on the electricity supply front. The Vancouver Island electricity supply issue is a case in point. BC Hydro has been trying to increase energy supply to Vancouver Island since 1990. Projections in 2002 indicated that peak load demand for electricity would exceed supply by 2007/2008.[23] BC Hydro has considered a number of gas-powered electricity generating projects over the last decade, each of which has not proceeded. It is currently proposing an upgrade and replacement of power lines to Vancouver Island. This has all been done within a context of BC Hydro assuring the public that there is adequate electricity supply in the province. In this context, the public is left wondering why it should support new power generation projects, especially those that may have undesirable impacts such as emissions or electrical fields.

BC Hydro must communicate an unambiguous message that British Columbia is importing electricity and the percentage is likely to increase over time. The public should be making a conscious choice about whether we wish to continue to increase imports rather than increasing domestic electricity supply. We should be informed that imports can be from coal burning plants in Alberta or nuclear sources in Washington State. We should weigh that against the information that British Columbia pays a lower price for these imports than the cost of building new electricity generation in the province. We should consider the longer-term implications of relying on imports as demand for electricity increases regionally and worldwide, leading to price uncertainty and supply uncertainty. In this context, we should be deciding whether to make

[23] Strategic Considerations for a new British Columbia Energy Policy: Final Report of the Task Force on Energy Policy, March 15, 2002, page 44.

other trade-offs such as major investment in conservation and energy efficiency measures as outlined in Strategic Imperative 5, developing new sources of supply from hydroelectric dams, natural gas, or providing public funding to increase the supply of alternative sources such as wind, solar, tidal or run-of-the-river hydroelectricity generation.

Each potential solution requires a balancing of interests and impacts. Is it better to use the latest clean coal technology to burn BC coal and accept that it will result in greenhouse gas emissions, or build a hydroelectricity dam that generates emission-free power but requires the flooding of a river valley? Is it better to build a natural gas pipeline and a generating plant on Vancouver Island or install a higher voltage power line from the mainland which will use electricity supply from elsewhere, including imports? Can we realistically manage by reducing energy demand through major conservation and energy efficiency measures?

BC has some tough choices ahead. In order to make any choice at all, we need the full picture and we need to be clear about the problem we are trying to solve. We can wait for a crisis in electricity supply to lead to public awareness and involvement in finding solutions, as occurred in Ontario or California, or we can start now to increase public communication and discussion to build public support for rational decisions.

BC Hydro has been effective in public education with regard to energy demand management and conservation through its energy efficiency programs such as PowerSmart.[24] At present both BC Hydro and FortisBC are planning or offering a number of innovative options for energy conservation and efficiency, as described in Strategic Imperative 5. Public awareness is critical to increasing participation in these alternatives, and consequently their impact on electricity demand.

Also, British Columbians are not generally aware of the size, or even existence, of the natural gas industry in the northeast of the province and the benefits and uses for this fuel source. More than half of the province's natural gas is exported. Natural gas royalties to the provincial government are approximately $2 billion a year, similar in amount to forestry royalties, and projected to increase for the foreseeable future. Natural gas can be used to meet many energy needs, but it is priced according to market competition and it cannot compete with the current price charged by BC Hydro for electricity. Nevertheless, natural gas companies and the provincial government should communicate the advantages of using natural gas to displace other fuel sources, for example:

- Using natural gas to displace coal, oil and propane reduces emissions and assists with transition to a lower emission world required by the Kyoto Protocol obligations;
- Natural gas can be a cheaper and lower emission fuel source for transportation, especially public transportation; and,

[24] Estimated BC Hydro savings between the decades from the early 1990s to 2002 attributable to energy-efficiency programs is 19,000 GWh (Source: Strategic Considerations for a new British Columbia Energy Policy: Final Report of the Task Force, March 15, 2002, page 22.) To get a sense of how much 19,000 GWh of electricity is, BC Hydro estimates the province needs 30,000 GWh over the next two decades (refer to Box 4 for more detail.)

- Meeting household requirements, such as heating, cooking and drying clothes, using natural gas rather than electricity is more energy efficient.

An example of proactively involving the public in building support for a new solution to meeting energy requirements is the agreement signed by Terasen, a natural gas utility, and the Resort Municipality of Whistler to develop a Sustainable Energy Strategy. The agreement has the overall goal of reducing fossil fuels. It proposes to use natural gas to replace the propane now used for household heating and the gasoline and diesel used in municipal vehicles. It also proposes a district heating system using ground source heat pump complemented by natural gas, landfill gas recovery, bio-gas and other technologies.[25]

As a further example of energy issues that face the province, there is the impact of the Alberta oil sands development to consider. The interrelationship between Alberta, BC and Washington State is poorly understood in the province with regard to both the export and import of power, as explained in Strategic Imperative 4. These energy relationships could become more significant with the development of the Alberta oil sands. The project will generate excess electricity and Alberta will be looking for a market for that electricity and a means to move the power to that market. It will also need to export the oil it is producing. The BC public needs to know about these opportunities and to consider our involvement. Will this be a good supply choice for our own domestic electricity? Do we want to be the conduit for the export of this electricity to the US? Do we want our ports to be used for the export of the oil? Are we willing to have a new pipeline built across the province to facilitate that export? Public information and education will be fundamental to ensure informed choices are made.

Recommendations

- BC Hydro should partner with an organization that specializes in public communication and education with regard to the energy sector, such as the Centre for Energy,[26] to develop and implement a comprehensive public information and education strategy with the goal of increasing public understanding of BC's electricity supply shortage and the choices we face in increasing supply;

- The provincial government, with BC Hydro, the BC Transmission Corporation, and the Centre for Energy, should explain to the public the regional interdependence in electricity transmission and natural gas and oil transportation, and the transmission and transportation requirement that this regional relationship requires. The public will only support new pipeline and transmission line projects if it understands their purpose and benefit to British Columbians;

[25] Whistler Sustainable Energy Strategy, Terasen and Whistler, May 2005.

[26] See www.centreforenergy.com. The Centre for Energy was established in 2002 with funding from the Canadian Association of Petroleum Producers, the Small Explorers and Producers Association of Canada and EnCana Corporation with the mission "to be the primary source of information, data and educational materials pertaining to Canada's energy sector and energy-related issues."

- Natural gas companies and the provincial government should communicate the advantages of natural gas in displacing other fossil fuels and in being more energy efficient than electricity for many uses; and,

- BC Hydro and FortisBC should increase public communication about the energy efficiency and energy conservation options that they currently have available for consumers with the goal of increasing their use.

IV. CONCLUSION

British Columbia's economy, as with every developed economy, relies on access to energy.

British Columbia is vulnerable with regard to its use of refined oil products, primarily for transportation. We import most of what we use and, as we can see every time we go to the gas pumps, we are price takers in a world of volatile and unpredictable oil prices and supply.

Our advantage lies with electricity and natural gas.

With regard to electricity, British Columbia has had a few strong decades of being able to supply its population and others with low-cost, reliable electricity from a renewable source, hydroelectric dams. That's as good as it gets. That advantage has diminished as no new sources of electricity have been developed. We are now net importers of electricity and we import more each year. This puts us in an increasingly weak position with regard to protecting our economy.

We don't need to be electricity importers. There are options open to us. We could build or expand hydroelectric dams. Depending on price levels, we could use our own natural gas to generate electricity. We could build small run-of-river hydro projects. We could put a sincere effort into developing real alternatives such as geo-thermal, wind, tidal, and solar generation. And of course we could get serious on a collective and personal level about conservation and efficient use of what we have. A reasonable approach would be to pursue all of these options, subject to price considerations, concurrently and in moderation. Then we will have a diversity of sources of energy while having a reasonable impact on the environment.

With regard to natural gas, we are unique in North America in that our discovered natural gas reserves and our production levels are still growing at a time when the demand for natural gas is increasing and reserves elsewhere are declining. However, British Columbians need to use natural gas more effectively. If it is used to replace coal or oil, it produces lower greenhouse gas emissions. Depending on price levels, it can be used very efficiently for electricity generation and for transportation.

We do need to do something, though. We haven't done anything significant to increase our electricity supply for twenty years. We will never be significant players in a global energy market driven by demand in the US, China and India but we may soon find ourselves in a world taking drastic measures to feed its unsustainable dependency on oil.

The least we can do is to take the opportunity to responsibly meet our own energy requirements where we are best able to do so.

Box 8:

The "Breaking Point"

In the past several years, the gap between demand and supply [of oil], once considerable, has steadily narrowed, and today is almost negligible. The consequences of an actual shortfall of supply would be immense. If consumption begins to exceed production by even a small amount, the price of a barrel of oil could soar to triple-digit levels [It is about $60 a barrel now]. This, in turn, could bring on a global recession, a result of exorbitant prices for transport, fuels and for products that rely on petrochemicals – which is to say, almost every product on the market. The impact on the American way of life would be profound: cars cannot be propelled by roof-borne windmills. The suburban and exurban lifestyles, hinged to two-car families and constant trips to work, school and Wal-Mart, might become unaffordable or, if gas rationing is imposed, impossible. Carpools would be the least imposing of many inconveniences; the cost of home heating would soar – assuming, of course, that climate-controlled habitats do not become just a fond memory."

Source: "The Breaking Point", by Peter Maass, The New York Times Magazine, August 21, 2005.

APPENDIX A: INTERVIEWS AND TELECONFERENCES

Interviews

April 21st – Victoria
Lorne Sivertson, President, Columbia Power Corporation
John Bechtold, Director, BC Oil and Gas Commission
Ross Curtis, Offshore Oil and Gas Team
Brenda Eaton, Deputy Minister, Office of the Premier
Sheila Wynn, Deputy Minister, Ministry of Energy and Mines
Joan Hesketh, Deputy Minister, Environmental Assessment Office

April 25th – Vancouver
John Winter, President, BC Chamber of Commerce
Wally Malkinson, Western Economic Consulting Ltd.
Jock Finlayson, Executive Vice President, Policy, Business Council of BC
Wayne Soper, Chair, International Centre for Sustainable Cities
Jerry Lampert, President and CEO, Business Council of BC
Brian McCloy, BW McCloy and Associates
Darcy Rezac, Managing Director, The Vancouver Board of Trade

April 28th – Vancouver
John Reid, President and CEO, Terasen Inc.
Randy Jespersen, CEO, Terasen Gas Inc.
Jane Peverett, CEO, BC Transmission Corporation
Bob Elton, President & CEO, BC Hydro
Bruce Young, Earnscliffe
Brian O'Sullivan, English Bay Energy
Eugene Hodgson, Seabreeze Power

May 4th – Vancouver
Roy Dyce, President and CEO, Greg Weeres and Kevin Teitge, Pacific Northern Gas Ltd.
Jim Fraser, BC Utilities Commission
Mossadiq Umedaly, Chairman, Xantrex Technologies Inc.
David Austin, Director, Independent Power Producers Association
Steve Davis, President, Independent Power Producers Association

May 5th – Calgary
Doug Haughey, President, Duke Energy Gas Transmission
Gary Weilinger, VP Marketing, Duke Energy Gas Transmission
Pierre Alvarez, President, and Steve Spalding, Canadian Association of Petroleum Producers
Michael Graham, EnCana Corporation
Ian Kilgour, Shell Canada Limited
Dan McFadyen, Vice President, Regulatory Affairs and Public Policy, Canadian Energy Pipeline Association

May 6th – Victoria
Peter Meekison, Energy Policy Task Force, 2002
Peter Ostergaard, Assistant Deputy Minister & Senior Staff, Ministry of Energy and Mines
Don Fast, Regional Director, Environment Canada, Pacific Yukon Region

May 11th – Vancouver
Dan Potts, Executive Director, Joint Industry Electricity Steering Committee
John Allan, President & CEO, Council of Forest Industries
Marie Crawford, Asst. Ex. Director & Peter Larose, Policy Analyst, Union of BC Municipalities

June 10th – Vancouver
Michael McPhie, President & CEO, and Alexandra Laverdure, Director of Policy, Mining Association of BC
Dick Gathercole, BC Public Interest Advocacy Centre
Morag Carter, Director, Climate Change Program and Ian Bruce, David Suzuki Foundation

Teleconferences

Jim Sinclair, President, BC Federation of Labour
John Walker, President & CEO, FortisBC
Chris Trumpy, Deputy Minister of Sustainable Resource Management
David Thompson, Former Deputy Chair and CEO, and Doug Horswill, Senior VP, Environment and Corporate Affairs, Teck Cominco
Chris Campbell, Executive Director, Ocean Renewable Energy Group

APPENDIX B: INTERVIEW AND TELECONFERENCE QUESTIONS

Energy in British Columbia
Opportunities for Growth
Questions for Interviewees

1. Do you think British Columbia should grow its energy sector? Please explain the reasons for your answer.

2. What opportunities exist for growing the British Columbia energy sector? Please outline these opportunities on the basis of priorities as you see them?

3. What are the largest obstacles to growing the BC energy sector and how can these obstacles be overcome?

4. In growing the BC energy sector, how do economic and environmental interests get appropriately balanced?

5. How should the BC energy sector be addressing the climate change issue?

6. How can regulation of the BC energy sector be improved? In this regard, have you any specific suggestions on how regulation of the BC energy sector by the provincial and federal governments can be better harmonized?

7. How can the general public in British Columbia be better informed on developments and opportunities in the BC energy sector?

8. What lessons on growing the energy sector can be learned from other jurisdictions?

9. Have you any other ideas or suggestions on growing the energy sector in British Columbia?

APPENDIX C: BOARD MEMBERS, STAFF AND ADVISORY GROUP MEMBERS

Members:

Mr. David Black, Chair
President
Black Press Ltd.

Mr. Alex A. Campbell
Chair
Thrifty Foods

Mr. Herman Driediger
CEO
Driediger Investments Ltd.

Ms. Eva Lee Kwok
Chair & CEO
Amara International Investment Corporation

Ms. Jill Leversage
Managing Director
Corporate and Investment Banking
TD Securities Inc.

Mr. Jeff Mallett
Former President & COO
Yahoo! Inc.

Mr. Gerry Martin
Co-owner
Kra-Mar Investments

Mr. Harry McWatters
President & Founder
Sumac Ridge Estate Winery Ltd.

Dr. Martha Piper
President & Vice-Chancellor
University of British Columbia

Mr. David Podmore
President & CEO
Concert Properties Ltd.

Mr. Jeet Sandhu
Owner
Eddie's Countrywide

Ms. Carol W. Seable
President & CEO
Fairmont Hotsprings Resort Ltd.

Mr. Jim Shepherd
President & CEO
Canfor Corporation

Mr. Ken Shields
Chairman & CEO
Raymond James Ltd.

Mr. Mark Shuparski
President
Pacific Capital Investments

Mr. Brian Surerus
President
Surerus Pipeline Inc.

Mr. David Thompson
Former Deputy Chairman & CEO
Teck Cominco Limited

Mr. Doug Whitehead
President & CEO
Finning International Inc

Staff:

Mr. Tim McEwan
Executive Director

Mr. Joel Emes
Senior Analyst

Ms. Monica Jang
Administrative Coordinator

Advisory Group Members:

Mr. Jock Finlayson
Executive Vice President - Policy
Business Council of British Columbia

Mr. Stuart MacKay
President
MMK Consulting

Dr. Richard Harris
Telus Professor of Economics
Simon Fraser University

Mr. Helmut Pastrick
Chief Economist
Credit Union Central of British Columbia

Dr. Maurice Levi
Bank of Montreal Chair in International Finance
Sauder School of Business
University of British Columbia

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